THE ROCKWELL

GAS REPORT

DEVOTED TO THE INTERESTS OF THE GAS INDUSTRY

VOL. 2 MAY 1957 NO.

Introducing

The ROCKWELL-Nordstrom Valve-Regulator

THE ROCKWELL-NORDSTROM VALVE-REGULATOR

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Over the past twenty-five years, gas pipeline and distribution operations have grown considerably in terms of loads and capacities. But, like any other rapidly growing business, gas companies have had to keep a constant watch on increased operating costs. The new Rockwell-Nordstrom Valve-Regulator is an example of a product development whose basic need is specifically based on reduction of operating costs and increased efficiency in gas pipeline operations.

Actually, the Rockwell-Nordstrom Valve-Regulator is not strictly a new product development. Over twenty years ago, some gas distribution and transmission companies devised their own pressure regulation systems incorporating a Rockwell-Nordstrom lubricated plug valve "positioned" by a cylinder actuator. The Nordstrom valve was used because it afforded much more precise control than other types of valves. Also, the lubricated plug requires much less torque for movement and assures instant response. Even twenty years ago, of course, the Nordstrom valve was an "old timer" to the gas industry.

In order to keep the cost of transporting gas to a minimum, it is necessary that the pipeline be operated at maximum flow and pressure. This, of course, means that pressure regulating equipment may—at times—be wide open and should offer a minimum of pressure loss. The flow pattern of a Rockwell-Nordstrom valve insures a minimum of pressure loss when in the full open position. And unlike conventional regulators, there is no "*change of direction*" in the flow stream, so the pressure loss is kept to a minimum. For example, the pressure loss on a Venturi Pattern Rockwell-Nordstrom Hypreseal valve can be compared with the overall pressure loss occurring in a Venturi meter.

Another regulating problem of modern times is the reduction of noise. Regulating stations which formerly were located in rural areas are now surrounded by housing developments. When ordinary regulators are installed above ground it is necessary to soundproof the station buildings. This is a costly, complicated procedure. However, when Rockwell-Nordstrom valves are used as part of a regulator device, the valve can be equipped with extensions and the valve body buried in the ground. The earth serves as a natural sound barrier and costs are greatly reduced because the Rockwell-Nordstrom valve does not require expensive boxes or vaults for underground installation.

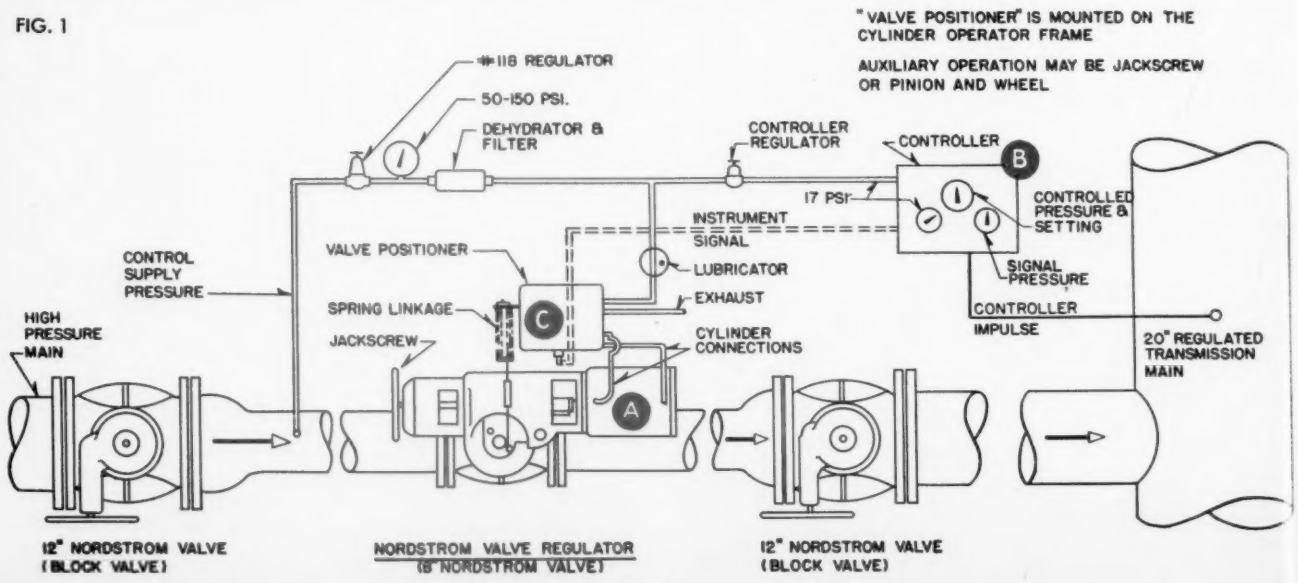
Although the cylinder operated plug valve regulator is effective on services such as low pressure control, back pressure relief, or on widely varying flows, it is at its best on high pressure applications where fairly large volumes are encountered. A typical installation would be a regulator furnishing high pressure gas to a city from a transmission line. Quite often, such stations must also limit the maximum flow and therefore, have pipeline capacitance between this station and the main town border station. Other useful applications include controlling gas coming out of storage and supplying gas to the town border stations.

How It Works

A typical set up of the Rockwell-Nordstrom Valve-Regulator is shown below. Basically, the regulator is a standard Rockwell-Nordstrom valve, the plug of which is automatically positioned by a piston type operator. In many ways, its operation is quite similar to that of a conventional diaphragm or motor head regulator. The difference is that pressure is used to position the valve in *both* directions whereas in the conventional regulator, a spring creates the force for movement of the valves in one direction.

The throttling action of the valve depends on the plug angle. Since the cylinder operator is the unit which supplies the power to turn the plug, the cylinder operator (A) is pressure ac-

FIG. 1



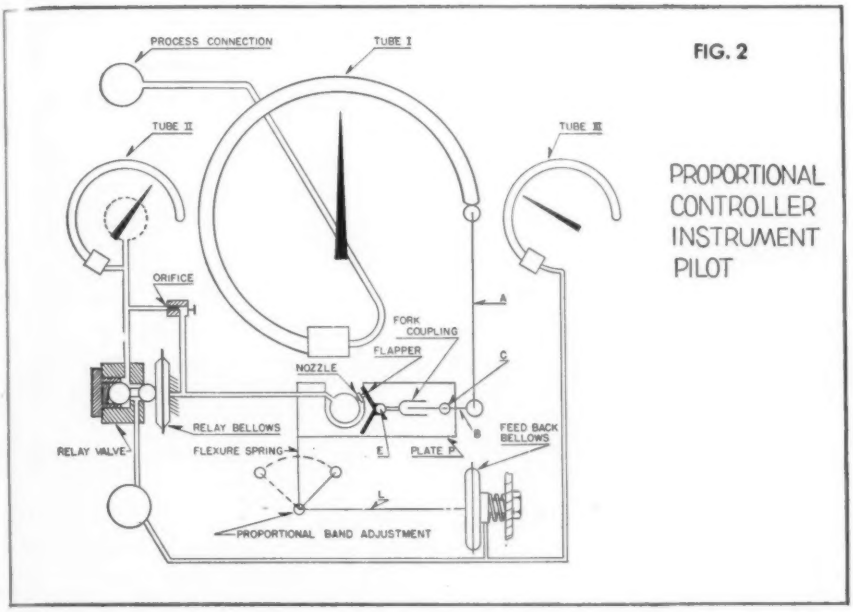


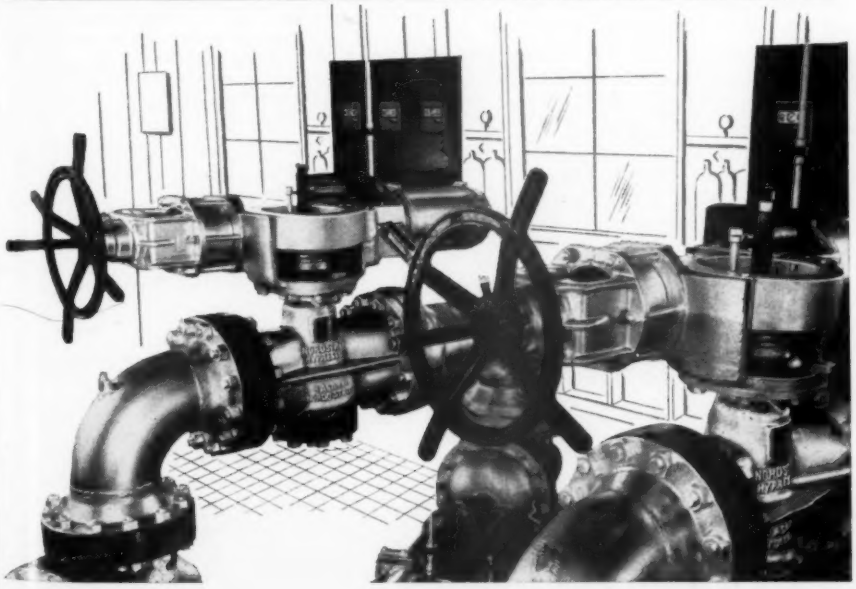
FIG. 2

PROPORTIONAL CONTROLLER INSTRUMENT PILOT

tuated to produce the proper valve position for throttling conditions. Normally, the cylinders used require pressures above 50 psig because lower pressure would require excessively large cylinder operators.

Automatic pressure control requires a pressure measuring device and a device for positioning the cylinder operator to give the proper throttling. The Rockwell Instrument Pilot (B) is the measuring unit and the primary control element of the Rockwell-Nordstrom Valve-Regulator. The Instrument Pilot determines the pressure variations and immediately causes corrective action through its control element. The Instrument Pilot produces a signal pressure of 3 to 15 psig of which each increment of pressure has a relationship to the position of the cylinder piston. However, the piston requires pressures in excess of the instrument output and also requires a pressure system that will act on either side of the piston. Since the Instrument Pilot cannot meet these requirements a pneumatic relay is placed between the primary control element and the cylinder operator.

A valve positioner (C), which is a pneumatic relay, converts the instrument signal pressure into a higher pressure differential across the operator piston. The valve positioner—by its unbalance—opens its relay pilot valves to cause pressure to move the piston in the direction of valve opening, while venting the opposite side of the piston. As the piston moves, the mechanical linkage between the piston and valve positioner causes a return to balance in the valve positioner and closes the relay pilot valves which stop the piston movement causing the regulator valve to remain in its new position.



The Instrument Pilot maintains the same signal pressure as long as the regulator outlet pressure does not change. However, immediately upon a change in outlet pressure, the Instrument changes signal pressure to reposition the regulator valve and reestablishes the outlet pressure setting. The rate at which the piston travels determines the relative stability of the control system and the rate of movement must be determined by considering the response time of the system being fed by this regulator. Piston speed can be easily determined at the time the regulator is put into operation.

The Instrument Pilot

(Fig. 2) consists of a measuring unit and control element producing a signal pressure of 3 to 15 psig. The Instrument requires a 17 psig supply for operation and this supply is normally taken from a No. 118 Rockwell Regulator supplying the control system. Since the instrument supply should be dry and filtered, it is advisable to place a dehydrator in the supply line.

The Instrument Pilot is shown in schematic form in (Fig. 2). The operation of instrument is as follows: The outlet pressure of the Nordstrom Valve Regulator is measured by the pressure measuring unit which positions the flapper valve (A) through link (B) to lever (C) through the fork coupling to the flapper which moves about its central pivot. The supply pressure shown on the supply pressure gauge (E) flows through the orifice restriction to the nozzle and to the relay bellows; also, supply pressure is led to the relay valve block. The relay valve consists of two steel ball valves which are controlled by the relay bellows. The valve stroke at normal capacity is about 0.007", corresponding to a bleed rate of ½ CFM at 9 psig signal pressure and a capacity of 1¼ CFM. Optional values of half or double may be obtained.

If the flapper position is changed in relation to the nozzle, the pressure in the system produces a change of position in the relay bellows. The orifice is about .010" diameter restriction while the nozzle has a .020" diameter opening. If the flapper moves away from the nozzle, a pressure decrease will occur causing the relay bellows to collapse making the relay valve vent port open and the supply port close causing the signal pressure to decrease. This decrease of signal pressure will cause the feedback bellows

(L) to collapse and through link and the proportional band adjustment lever give an upward thrust to the flexure spring. This motion will cause Plate to move clockwise about the pivot of the flapper and to lower lever to cause return movement to the flapper. This action, which counteracts the initial movement, causes the control to reach equilibrium with the change in signal pressure proportional to the change in measurement.

The new signal pressure will cause the regulator to open and bring outlet pressure to normal and the sequence of events will proceed as measurement returns to the set point. The speed of which these events proceed is quick; the signal pressure changes follow the measurement changes in a smooth corrective action.

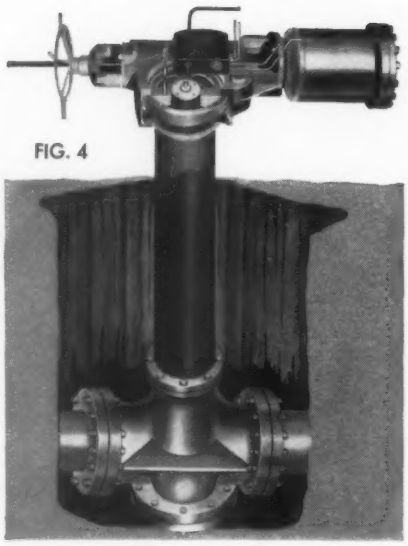


FIG. 4

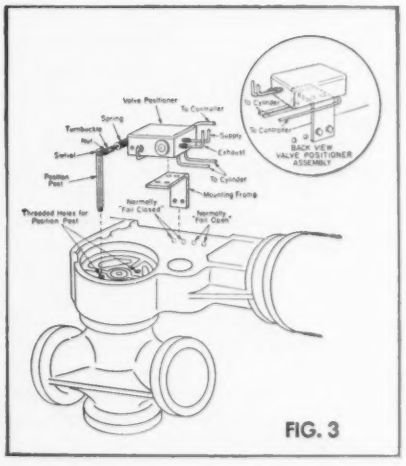


FIG. 3

Operation of the Valve Positioner

The valve positioner (Fig. 3) incorporated in the Nordstrom Valve Regulator serves as a pneumatic relay and a mechanical "feedback" device to prevent over travel and to stabilize the system.

Basically, the valve positioner balances the piston in direct relationship to the signal pressure of the Instrument Pilot.

The signal pressure of the instrument is applied to the valve positioner bellows. This creates an upward force on the lever system causing the valve to move upward, opening the supply to one side of the cylinder and exhausting the other side of the cylinder. Counteracting this force is the external spring which returns the lever system to a balance of forces as the piston moves. This balance of force returns the pilot relay valves to a central position stopping the piston's movement.

The internal spring is used to obtain a zero effect or balance at the initial stroke of the piston. The adjustment of stroke is accomplished by moving a rack and gear fulcrum adjustment between the two levers.

The supply pressure to the valve positioner is set at the required cylinder pressure depending upon the rate of piston movement desired. The cylinder exhaust can be piped to atmosphere. A lubricator is placed in the supply line of the valve positioner to provide lubrication to the piston.

Fail Open—Fail Close

Consistent with good safety practice, the Rockwell-Nordstrom Valve-Regulator can easily be set up for either "Fail Open" and "Fail Closed" operation. This means that if for any one of a number of operating reasons (such as a line break) the signal pressure is lost, the valve will instantly move to a completely open or a fully closed position.

Extensions

Some regulator installations have become objectionable because of the noise caused by the throttling action of the regulator. The Rockwell-Nordstrom Valve-Regulator is quieter than a conventional regulator, but when large capacities are encountered even this noise could be objectionable if the station is in or around housing areas.

Rockwell-Nordstrom Valve-Regulators can be furnished with extensions which permit the Nordstrom valve itself to be buried while the cylinder operator and controls are at ground level. Such installation takes advantage of the insulation to sound that ground offers, without requiring special vaults or bringing the transmission lines to the surface. The Nordstrom valve is a sealed unit and the extension makes the valve operating equipment available for inspection and maintenance.

Questions and Answers

1 Q What is the line size limitation?
A The Rockwell-Nordstrom Valve-Regulator is normally used on lines 6" and larger.

2 Q What are the pressure limitations?
A The regulator is most efficient on pressures over 50 psig inlet.

3 Q Does Rockwell manufacture just the valve or is the entire unit shipped as one piece?
A The complete unit is supplied by Rockwell Manufacturing Company, but is shipped dis-assembled.

4 Q What special technical personnel are necessary to install the Rockwell-Nordstrom Valve-Regulator?
A None.

5 Q Do you have to lubricate the valve?
A Yes. Lubrication insures longer life at lower cost.

6 Q What about wear? The valve seems to move a great deal.
A Lubrication prevents metal-to-metal wear.

7 Q Are block valves necessary?
A Yes. Like any regulator installation, block valves are almost always recommended.

8 Q Are by-pass lines necessary?
A Yes. They are an added safety factor that should be considered for every regulator installation.

9 Q What kind of a vault is used for buried installations?
A Since the Rockwell-Nordstrom valve is a self-contained unit, the addition of valve extension permits burying the valve without a vault and with a minimum of excavation.

10 Q Do I have to fabricate extensions?
A No. Valve extensions are available from Rockwell.

11 Q Can I use the Rockwell-Nordstrom valves in my inventory and order just the other components?
A Yes.

12 Q Can any other type of plug valve be used?
A No.

13 Q How far away may the instrument controller be located from the regulator?
A Distance should not exceed 100 feet.

South's Building Boom Points Need For Utility-Builder-Architect Cooperation

AGJ Survey Report

CONSTRUCTION is considered a bellwether of the nation's economy — and trends in the construction industry often give the gas utility industry ideas on which it can pinpoint its efforts to build load.

For its annual survey of the 14-state Southern Gas Association area on construction activity and trends, AMERICAN GAS JOURNAL this year went looking for something more than statistics and predictions.

As in the past, this survey was conducted in cooperation with F. W. Dodge Corporation, specialists in reporting construction information. AGJ asked the Dodge reporters throughout SGA-land for specific reports on trends and for their authoritative comments.

Results of the comprehensive survey point out that the South's building boom is continuing, that there's a big load available in many forms for the SGA-land gas utilities, and that more emphasis must be given to activities such as working with builders and architects.

For instance:

More and more homes are being architect-designed, and architects often have a voice in selection of heating and air conditioning equipment.

More and more houses — both those built speculatively and custom homes — have "built in" appliances — not only ovens and burners, but also refrigerators, incinerators, etc. Builders find they help sell the houses.

More shopping centers, office buildings, hotels, motels, hospitals, and industrial plants are being built throughout the South. Architects and architectural engineering firms do most of this design — they select equipment to be installed in these buildings. Here is a very substantial market for gas air conditioning.

Air conditioning is no longer considered a luxury in commercial and industrial buildings—it is a must. It's becoming a must in most high-priced houses. Here, too, is a big potential for gas air conditioning.

Construction Activity In the Southern States for 1956 — ($000).

State	Residential	Non-Residential	Public works and utilities	Total construction
Texas	661,165	608,290	349,616	1,619,071
Louisiana	167,653	206,844	252,176	626,673
Mississippi	38,187	75,071	47,605	160,863
Alabama	138,636	146,698	143,771	429,105
Georgia	196,924	197,810	77,375	472,109
Florida	611,358	297,999	202,628	1,111,985
South Carolina	63,908	94,894	82,830	241,632
Tennessee	114,326	166,440	104,617	385,383
Oklahoma	119,366	150,103	103,709	373,178
Arkansas	41,130	62,267	48,547	151,944
Kentucky	137,516	120,720	104,486	362,722
Virginia	278,047	186,752	146,974	611,773
North Carolina	88,977	166,036	84,062	339,075
TOTALS	2,657,193	2,479,924	1,748,396	6,885,513
Dollar difference from 1955	−88,675	+150,340	+36,915	+98,580
Percent difference from 1955	−3.2	+6.5	+2.2	+1.5

Table courtesy of F. W. Dodge Corporation.

Architects, Builders Important to Utilities

It's no secret that the gas industry's chief competitor in the South (across the country for that matter) is the electric industry. And the electric industry thinks highly of architects and builders. The electric industry works closely with this core of the construction industry — architects and builders have a big voice in the selection of equipment for buildings, large and small.

To enlist the aid of these architects and builders, and get their whole-hearted cooperation, gas utilities must provide more than lip-service. Adequate, factual information on gas appliances, equipment, and air conditioning machinery should be given them. Most gas utilities have builder-service and architect-service representatives. The big question is: "Is this service adequate?"

No one program will suffice for all gas utilities. Each company should have an individual program, designed to meet the needs of its area and architects and builders with whom it comes in contact.

What's Going On?

As reflected in the survey, highlights and comments from the various reporters on their areas, the outlook for 1957 is good. Dollar volume in nearly every phase in all states will be up — or at least even with 1956. "Tight money" for residential housing has the homebuilding industry, but nonresidential and heavy engineering construction are on the upswing.

For this survey of current activity and trends, AGJ asked the Dodge reporters a number of questions. The following columns present their comments, plus tables reflecting highlights of the survey.

Q. What's the Most Unusual Feature of Construction Activity In Your Area?

Tight money — *Alabama.*

Prominent Arkansas architect Noland Blass Jr., says that nearly all of the major architectural offices are using contemporary design in their production — *Arkansas.*

Capehart Housing. In the Southeast, statistics show housing is up in dollar volume — but most of it is in the Federal housing projects. Private housing is off 20 to 30 percent — *Georgia.*

Speed — *Florida.*

More branch plant locations in 1956 than in any previous period — *Kentucky.*

Phenomenal growth of petroleum and chemical industry here — *Louisiana.*

Large number of schools and churches planned and built; good sign of community growth — *Mississippi.*

Shopping centers springing up — *North Carolina.*

Construction men fought terrain and bitter cold in the construction of PNW's "scenic-inch" pipeline.

Why communications have to be good on Pacific Northwest's "scenic-inch" line

Pumping gas over mountain passes across 1487 miles of America's toughest terrain requires the most reliable communications available.

Pacific Northwest Pipeline Corp. presented this requirement to the Bell System, with one additional request—economy.

The result is a private line telephone system that PNW's Salt Lake City control center uses to keep a running summary of conditions along the line. Information gathered in Salt Lake City from each compressor station includes dew point, BTU content and specific gravity of the gas. Dispatchers use this data as guidance in controlling flow.

• • •

Bell System communications can work for you as fast and reliably. Just call your Bell Telephone Company business office. A representative will gladly discuss your requirements.

Pacific Northwest's Salt Lake City dispatchers collect data hourly from every compressor station and maintenance point on the company's 1487-mile pipeline.

BELL TELEPHONE SYSTEM

PRIVATE LINE TELEPHONE • PRIVATE LINE TELETYPEWRITER
DATA TRANSMISSION SYSTEMS • CHANNELS FOR: REMOTE METER-
ING AND CONTROL • TELEPHOTOGRAPH • CLOSED CIRCUIT T

How 1957 Compares With 1956.

States	Total	Types of Construction: Residential	Non-Residential	Heavy engineering
Alabama	Up	Up	Up	Down
Arkansas	Up	Up	Up	Up
Georgia	Up	Down	Same	Up
Florida	Up	Up	Up	Up
Kentucky	Same	Down	Same	Up
Louisiana	Up	Down	Same	Up
Mississippi	Up	Down	Up	Up
North Carolina	Same	Down	Up	Up
Oklahoma	Up	Up	Up	Up
South Carolina	Up	Same	Down	Up
Tennessee	Up	Same	Up	Up
Texas	Up	Down	Up	Up
Virginia	Same	Same	Same	Same

Air Conditioning Installation Trends.

State	Residential	Commercial	Industrial
Alabama	More	More	More
Arkansas	More	More	More
Georgia	More	More	More
Florida	More	More	Same
Kentucky	More	More	Same
Louisiana	More	More	More
Mississippi	More	More	More
North Carolina	More	More	More
Oklahoma	More	More	More
South Carolina	More	More	More
Tennessee	More	More	Same
Texas	More	More	More
Virginia	More	Same	Same

Competition between downtown merchants and property owners and the suburban developers is keen — *Oklahoma.*

Less school construction, but more public utility and heavy engineering projects — *South Carolina.*

Luxury apartment buildings coming into their own here. Some are cooperative ventures with all tenants sharing in the project — *Tennessee.*

Rather drastic decrease in homebuilding activity. Tight money — *Texas.*

Intense competition among contractors and sub-contractors, which tends to hold costs in line despite increases in cost of labor and materials — *Virginia.*

Q. What Will Happen to Construction Activity In Your Area In 1957?

All types of work in Alabama will either be greater or about the same as 1956. During first two months of 1957, non-residential was up substantially, residential was up 57 percent, while heavy engineering was down 45 percent — *Alabama.*

Statistical records show residential construction in Arkansas is definitely up. However, this is due to the start of a Capehart Housing Project at Little Rock Air Force Base. Overall construction will probably continue to rise throughout 1957 — *Arkansas.*

While residential construction may dip slightly, it will be up some — at least in dollars — *Florida.*

Dollar volume of total construction in Kentucky will be about the same as 1956, with the slow down in residential construction picked up dollar-wise by an increase in heavy engineering construction. Non-residential will remain at about the same dollar figure — *Kentucky.*

Federal (Capehart) housing will bring total residential construction in Louisiana above 1956. Private residential housing will probably be slightly lower, unless there is a turn-about in government policies and down payments lowered—*Louisiana.*

1956 was expected to be another "banner year" for all construction in Oklahoma, but these expectations failed to materialize. Although non-residential construction showed a decided increase, total construction was down considerably, due to decreases in residential and heavy engineering contract awards. Tight money seems to be the cause of decreased residential construction, rather than an "overbuilt" situation. All construction is expected to exceed 1956 — *Oklahoma.*

School money is tight, and will probably result in a drop in non-residential construction — *South Carolina.*

Expect small increases in non-residential construction and rather large increases in heavy engineering due to accelerated highway program — *Texas.*

Residential construction is the most uncertain class, as far as predicted volume is concerned, but as mortgage money seems to be getting more plentiful, there is little doubt it will at least equal last year's record — *Virginia.*

Q. What Are the Trends On Installation of All-Year Air Conditioning?

Primarily electric units are being installed — *Alabama.*

Largest gas air conditioning unit in the state to be installed this year. Unit will be used to heat and cool new State Supreme Court Building. Such installations will probably stimulate other demands for the same type unit — *Arkansas.*

In the house field where duct work can be used for heating and air conditioning, you'll find electric air conditioning as a rule — *Georgia.*

Trend toward all-year air conditioning continues — more in better type residences, most all commercial buildings, and in many industrial buildings. **All year air conditioning is becoming a "must."** Have not noticed any trend toward installation of gas air conditioning equipment as most installations are still electric — *Mississippi.*

There has been no particular trend toward installation of gas air conditioning, but some air conditioning contractors in Oklahoma have secured gas air conditioning franchises and are beginning to make quite a number of installations. Cost of operation seems to be a big factor — *Oklahoma.*

Trend is towards heat-pump in Tennessee. Gas dealers appear to be content with only the heating business in this area, and the air conditioning market is not being worked as it should be — *Tennessee.*

Field is wide open for gas air conditioning in Texas because of rather high electricity charges. Gas is more economical — *Texas.*

Q. What Are the Trends in Shopping Centers, Office Buildings, Plants?

Shopping centers and industrial plants are on the increase. Motels and small office buildings follow in second place — *Alabama.*

With increased construction of industrial plants, it may be expected that shopping centers, office buildings, etc., will be constructed in a similar ratio. Naturally, new industries call for new employment, new houses, and in turn the progress of all construction will have an upward trend — *Arkansas.*

This South Florida "Gold Coast" area is rapidly growing, and construction should remain at a high level — *Florida.*

Activity in location of branch plants of national firms in 1956 was greater than in any previous period for Kentucky — *Kentucky.*

Number of shopping centers being planned and constructed in Mississippi is probably running on an even course, but the

Commercial and Industrial Building Construction Trends.

	Shopping centers	Hotels, office buildings	Industrial plants
Alabama	Up	Up	Up
Arkansas	Up	Up	Up
Georgia	Up	Up	Up
Florida	Up	Up	Up
Kentucky	Down	Same	Up
Louisiana	Up	Up	Up
Mississippi	Up	Up	Same
North Carolina	Up	Up	Up
Oklahoma	Up	Up	Up
South Carolina	Up	Same	Up
Tennessee	Same	Up	Same
Texas	Same	Up	Down
Virginia	Up	Down	Same

Trend Towards Architect-Designed Homes.

Alabama	Yes
Arkansas	No
Georgia	Yes
Florida	Yes
Kentucky	No
Louisiana	Yes
Mississippi	No
North Carolina	Yes
Oklahoma	Yes
South Carolina	Yes
Tennessee	Yes
Texas	Yes
Virginia	Yes

size of these centers is larger than ever before. Trend is toward larger shopping centers. We have practically no hotel construction, but the number and size of office buildings is up. Just about holding our own in construction of industrial plants, but hope that we will start making larger gains in this field — *Mississippi.*

Shopping center construction in some areas will be at a much slower pace than previously, while other areas will continue at a rapid pace. Motels are increasing, while hotels are at a standstill. Construction of office buildings and industrial plants is increasing rapidly. Oklahoma is acquiring large number of "branch office" industrial plants as well as new factories — *Oklahoma.*

South Carolina is still attracting more and more industries — *South Carolina.*

Much public work in prospect, including streets, sewers, schools, and other necessary buildings. Several office and luxury apartment buildings are in the mill — *Tennessee.*

Q. Are More Architect-Designed Homes Being Built In Your Area?

Yes, not only in Alabama, but in a recent survey made of architectural firms, among the firms reporting gains where architects' services were used on individual houses, increases ranged from 10 percent to as much as 300 percent. Feeling is that people will get more of what they desire by having an architect design and supervise the construction of the house — *Alabama.*

No, bulk of houses have been for speculative purposes and do not use a so-called custom design. Architect-designed homes are generally for people who desire custom design — *Arkansas.*

Survey of six architects in Atlanta who primarily do custom built homes shows their business is up from 10 to 30 percent in first quarter — *Georgia.*

Better homes seem to be the trend — *Florida.*

No particular trend toward more architect-designed homes, but they seem to be holding up in numbers, contrary to recent decline in residential activity as a whole. In other words, the better class home is holding its own, while the low priced home for owner occupancy as well as speculative-built houses for sale have dropped off — *Kentucky.*

No trend toward more architect-designed homes in Mississippi. Main reason is that architects are busy with non-residential type work and are not pushing for home market — *Mississippi.*

Most licensed architects in Oklahoma do some residential work, but majority of this work is done by architectural designers. Since speculative residential building has been off, there has been a trend toward designing and building of more owner-occupied houses. Some speculative builders have switched to building more costly homes — *Oklahoma.*

Yes, but only because architects have less work on other types of construction and are using houses as a replacement — *South Carolina.*

Trend is definitely toward architect-designed custom homes; emphasis is on quality, and larger homes — *Tennessee.*

Recent national survey shows trend toward more architect-designed homes. Also true in this area. However, total volume of houses off — particularly, low cost houses — *Texas.*

Trend will probably continue as more young firms interested in house design are being established. It is far easier now to obtain competent architectural services on a moderate priced house than during the past several years — *Virginia.*

Q. Are Appliances Being Included As Original Equipment In New Homes?

Ranges, built-in kitchens, air conditioning, and water heaters are being included in homes as original equipment. Washers and dryers sometimes, but not frequently. Incinerators — no — *Alabama.*

Speculative builders have found that by installing new appliances throughout their homes, they establish a selling point for the prospective buyer. This is not only true with appliances, but also with the installation of heating and air conditioning — *Arkansas.*

Some, but not refrigerators or incinerators — *Georgia.*

More homes have built-in features and appliances — *Florida.*

Definitely yes, especially in homes costing above $20,000 — *Kentucky.*

Built-in kitchens are providing washers — dish washers — built-in ranges and ovens — refrigerators as original equipment — *Louisiana.*

In better type homes, built-in appliances such as refrigerators, ranges, built-in kitchens, incinerators, and water heaters are being included as original equipment. This is mainly in owner occupancy homes. Beginning to be done by builders also — *Mississippi.*

Competition among speculative builders is about as keen as that existing between general contractors and others in the industry. In order to attract buyers, builders are including all the appliances they can and employing any other idea they may have — *Oklahoma.*

Especially in speculative houses as a selling point — *South Carolina.*

Many homes are now being equipped with garbage disposals, built-in kitchens, and water heaters. Many builders are listing any appliance as optional equipment — *Tennessee.*

Very definitely — builders are loading houses with extra features to help merchandise — *Texas.* ★ ★

Coming Up: One Golden Anniversary!

On Eve of 50th Year of Progress, SGA Looks to the Future

R. A. Puryear, Jr.
President, Alabama Gas Corporation, Birmingham, Alabama.

R. A. Puryear, Jr.
President, Southern Gas Association

THIS has been a forward-looking year in the Southern Gas Association.

Our achievements, thanks to our committee and section chairmen and other hard workers, have been many, and they have been important. But most significant, to me, is the fact that these achievements, each of them, is looking to the future, laying the groundwork for a stronger, more successful gas industry.

In this changing civilization of ours, we cannot afford to use the past as a yardstick for the future. Who, a few years ago, would have been rash enough to predict that summertime use of natural gas would exceed that of winter? But we have actual figures on gas air conditioning installations which prove that such can well be the case.

SGA Is Heart of Air Conditioning Market

Our SGA territory is the center of the market for air conditioning in the nation, and I am proud of the work of our SGA Heating and Air Conditioning Committee, chairmaned by G. J. Tankersley, vice president of the Gas Light Company of Columbus, Georgia. One of its subcommittees, headed by John Moore of Lone Star Gas in Dallas, met with General Services Administration officials in Washington and succeeded in having GSA specifications rewritten so gas air conditioning units could be considered for use in government buildings. I can't overstress the importance of this, for here is a big market — the government is going to spend $400 million on air conditioning, 75 to 80 percent of it in our SGA South.

Our Gas Code Committee, of which H. N. Oldham, Pioneer Natural Gas Company, is chairman, has been most helpful to the Southern Building Code Congress in keeping its specifications in line with modern improvements in our industry.

Our Round Table Conferences — 37 of them during the year, covering a wide variety of subjects — continue to be the backbone of our organization. Four of these, incidentally, were devoted wholly to air conditioning. Held for the first time was a Transmission Sales Round Table attended by the principal sales representatives of our many transmission company members. Public Relations was also the subject of a round table. This was a cooperative effort between SGA and AGA.

Committees, Conferences Spearhead Progress

Our Management Development Course, with its emphasis on the "middle management" man, concluded its third successful year, and our short course in gas technology entered its second decade of service to the industry. To these we will add this summer a 4½-day short course for service supervisors, a sometimes overlooked branch of training. This will be held August 26-30 at Georgia Institute of Technology at Atlanta, and our chairman for it, W. B. Hambright of Atlanta Gas Light Company, is arranging a curriculum to embrace the problems that our service departments face.

Again keeping pace with progress, our committee chairmaned by H. K. Griffin of Mississippi Valley Gas Company, has rewritten our by-laws to better serve our association's present and future needs.

Our highly successful Pulsation Research Project will be concluded June 1. Our Pipe Improvement Council is getting under way and will study methods of inspecting pipe at the mill — a project which, when successful, will eliminate many a trouble-shooting job. Then we hope to figure out a way to inspect pipe in the ground—what a time and money-saver that will be!

"Built-In" Gas Load In the Kitchen?

But while we pay attention to these industrial problems, I don't want us ever to forget that our paramount interest still lies in the home — in the kitchen, in the laundry room, in heating and air conditioning — that is where a major portion of our gas load lies. I particularly like this new emphasis AGA is putting on the "built-in" — which I see as our lucrative field for the future. Here we have as prospects not only our new families, but those families that we may thoughtlessly classify as "non-prospects" because they already have gas appliances.

The dominant desire today is to "Be Modern" — to get a step ahead of the Joneses. By developing and concentrating on the "new look" in gas appliances, we can help the housewife achieve that goal. Let's show her how a built-in oven and broiler, a counter-top range, an automatic ice-cube making refrigerator-freezer, can give her old kitchen that streamlined, jet-age look. Let's think about an all-in-one gas laundry unit that could include a washer, dryer, clothes hamper, storage cabinets and water heater, attractively arranged in one large unit for maximum convenience and efficiency. And let's show the whole family that built-in that all Southerners want — year-round weather-conditioning.

Our past shows much progress, but our future can really be terrific! SGA, born in 1908, is truly entering its golden anniversary year with glittering prospects.

"Round Tables" Are a "Square Deal"

Free interchange of ideas and information helps build success. That's the idea behind SGA's Round-Table conference — the backbone of the organization. Problems are discussed and most often solved — and all participants benefit. In the 1956-57 year, SGA held 37 such conferences — all highly successful. Success of these meetings by the various SGA sections — plus reports on other important activities — are related here.

Distribution Section

—W. B. Hambright

Six conferences, establishment of a short course for service supervisors, and further development of a home study course for distribution employees highlighted 1956-57 activities of the Distribution Section. Conferences for the year included:

Western Area Distribution Operations and Maintenance Conference was held at Little Rock, Arkansas, August 24 under the sponsorship of A. W. Durning, Louisiana Power and Light Company. Twenty-nine delegates representing 13 companies attended. Conference subjects included pipe protection methods, use of light weight pipe, plastic pipe and fittings, records, leakage control and surveys, welding, odorization, use of mechanical equipment and other general operating problems. Liability of contractors on street paving, water, or sewage jobs was also discussed.

Eastern Area Distribution Operations and Maintenance Conference held in Birmingham, Alabama, September 21 under the sponsorship of Joe T. LaBoon, Atlanta Gas Light Company, attracted 23 people representing 8 companies. Main connections methods, cast iron pipe use for high pressure flow, pipe coating, methods of tapping cast iron mains, and new service construction were among topics discussed at this conference.

ASA B31.1 Sec. 8 Code Application to Distribution Systems Conference held in September was attended by 31 representatives of 20 companies. Group heard discussions of test requirements for mains and services, qualification of mains for high pressure, service shutoff requirements, location of meters, type of controls and regulators that should be used, and records and costs of complying with the Code. John Glamser, Oklahoma Natural Gas Company, was sponsor of the New Orleans meeting.

Eastern and Western Area Air Conditioning Design, Installation and Service Conferences both met jointly with sales groups the first day of their respective conferences to discuss air conditioning sales topics.

The Western Area Conference, held in Tulsa, Oklahoma, November 5-6 was attended by a total of 56 individuals from 19 companies. Several manufacturer representatives attended the joint distribution-sales meeting November 5. Ira W. Wilke, Southern Union Gas Company sponsored the second day session of air conditioning design, installation, and service. M. E. Orelup, Oklahoma Natural Gas Company, was sponsor of the sales meeting. The Eastern Area meeting was held in Atlanta, Georgia, November 12-13. E. J. Hoffmann, Mobile Gas Service Corporation, sponsored the second day distribution group air conditioning design and service session and W. D. Fortner, United Gas Corporation, sponsored the sales meeting. Thirty-five representatives from 14 companies attended.

Distribution Managament Conference sponsored by S. V. O'Lenic, section vice chairman, met in New Orleans March 7 and 8. Some 39 people representing 25 companies attended the session where progress reports on section activities and plans for the coming year were discussed. J. Stanford Setchell reported on AGA Operating Section activities and outlined plans for the Houston Distribution Conference April 8-11.

Distribution section member companies polled during the past year favored the establishment of a supervisors' short course to be held at Georgia Institute of Technology in Atlanta August 26-30. The Natural Gas Industry Service Supervisors' Short Course will consist of 4½ days of instruction on subjects including human relations, gas industry safety, on-the-job training, legal aspects of gas service work, and new developments in appliances and equipment. A brochure outlining all details is being prepared.

Investigation work on the possibility of a home study course on natural gas distribution was completed under the sponsorship of B. F. Worley. He recommended full committee cooperation with the Institute of Gas Technology in the preparation of the course currently underway. The Institute has agreed to a review committee, appointed by the section, studying and making recommendations concerning the course text. H. K. Griffin will assist the review committee in its work. Of nineteen chapters planned for the course, four chapters are ready for review; tentative chapter outlines for entire course have been reviewed and certain modifications to make the material more suitable to companies in SGA territory have been indicated.

Sets of the slide film, "Let's Take A Look at What Our Customers See," presented by H. N. Oldham at the SGA and AGA annual conventions may be purchased by SGA members from SGA office for $75.00.

Sales Section

— L. P. Thomas

Sparking the Sales Section activities in the 1956-57 association year were enthusiastic participation in various round table activities and members' confident endorsement of growth and progress of the industry. As always, the 10 round table conferences were focal points of section activity. Certain departures from past practices, as well as innovations in the schedule, were tried out in past year with gratifying results. Industrial Sales and Commercial Sales Round Table conferences were held on successive days at the same location. (Each had previously been held in a-

ternate years.) A Transmission Sales Round Table was added to the section program.

Complete line-up of all 10 conferences included:

Sales Executives Conference, New Orleans, February 16-17 under sponsorship of L. Proctor Thomas, Houston Natural Gas Corporation.

Home Service Conference, Shreveport, July 26-27, sponsored by Miss Emagene Burge, United Gas Corporation.

Industrial Sales Round Table, Dallas, August 2 sponsored by John F. Moore, Lone Star Gas Company.

Commercial Sales Round Table, Dallas, August 3 sponsored by Ardmore J. Healy, Lone Star Gas Company.

Advertising Round Table, New Orleans, September 14 sponsored by Jack A. Bell, Alabama Gas Corporation.

Residential Sales Round Table — Eastern Area, Chattanooga, September 28 sponsored by Dan C. Ewing, Nashville Gas Company.

Residential Sales Round Table — Western Area, Dallas, September 28 under sponsorship of J. P. Kenney, Empire Southern Gas Company.

Transmission Sales Round Table, Houston, October 26 under sponsorship of James E. Allison, Texas Gas Transmission Company.

Western Area Air Conditioning Sales Round Table, Tulsa, November 5-6 under sponsorship of M. E. Orelup, Oklahoma Natural Gas Company.

Eastern Area Air Conditioning Sales Round Table, Atlanta, November 12-13 under sponsorship of W. D. Fortner, United Gas Corporation.

Incoming chairman Richard P. Hill served during the past association year as a one man committee to develop a gas utilization handbook for the SGA membership. Work is progressing, he reports, and the handbook is expected to be in the hands of subscribers before the end of 1957.

Sponsorship by gas utilities of the national TV show, "Playhouse 90," was heartily endorsed by the Sales Executives Conference in February 1956, when such a program was little more than a hope in the minds of some industry leaders. This was the first group support accorded this undertaking and proved to be a real boost forward to the establishment of the program.

Transmission Section

— L. C. Poindexter

Principal component of 1956-57 Transmission Section activities was its series of 10 round table conferences. As a result of attendance review, the Transmission Management group decided to institute a new conference for measurement superintendents and dispense, temporarily at least, the conferences for the natural gas gathering and processing group and natural gas drilling and production group.

Conference schedule for the past year included:

Pipe Line Right-of-Way, Dallas, July 9, sponsored by Gerdes W. Rice, Lone Star Gas Company.

Chief Draftsmen, Dallas, July 9, sponsored by Frank E. Williams, Transcontinental Gas Pipe Line Corporation.

Pipe Line Chief Engineers, Shreveport, July 27, sponsored by N. P. Chesnutt, Southern Union Gas Company.

Chief Dispatchers, Shreveport, July 27, sponsored by I. P. Robinson, Texas Gas Transmission Corporation.

Compressor Station Chief Engineers, Tulsa, August 9-10, sponsored by P. J. Chandler, Arkansas Louisiana Gas Company.

Pipe Line Operations and Maintenance, El Paso, August 17 sponsored by W. T. Bulla, Texas-Illinois Natural Gas Pipeline Company.

Gas Measurement Superintendents, Birmingham, September 21, sponsored by C. E. Terrell, Southern Natural Gas Company.

Engineering Use of Electronic Computers, Houston, October 26, sponsored by C. C. Homan, Jr., El Paso Natural Gas Company.

Transmission Management fall conference, Dallas, September 18 sponsored by L. C. Poindexter, United Gas Pipe Line Company.

Transmission Management spring conference, New Orleans, March 7-8 sponsored by Sy Orlofsky, Gulf Interstate Gas Company.

Accounting Section

— F. M. Featherstone, Jr.

Six round table conferences highlighted Accounting Section activities during the 1956-57 association year.

Transmission and Production Accounting including integrated data processing and transmission of data by microwave were discussed at the first round table meeting in Galveston July 23 sponsored by W. H. Cook, Colorado Interstate Gas Company. Twenty-eight attended.

Distribution Accounting was the subject of the second meeting in Dallas August 3 with B. F. Wombacker, Southern Union Gas Company, sponsor. Attended by 26 representatives of member companies, the group welcomed Mrs. E. L. Eppler and Miss Mildred Laughlin of Louisiana Nevada Transit Company, one of the association's new members.

Property Accounting was discussed at the Jackson, Mississippi, meeting sponsored by John Wendel, Tennessee Gas Transmission Company. Forty-nine attended. Morning session was devoted to a general plant accounting discussion and the afternoon session was divided, with Wendel serving a chairman of the transmission group and Mike C. Gaines, Houston Natural Gas Corporation, serving as chairman of the distribution group.

Western Area Customer Accounting meeting, held October 26 in Houston, was sponsored by W. R. Stephens, Lone Star Gas Company. Attended by 30 representatives of 13 companies, the meeting agenda covered practically all phases of customer accounting.

The Eastern Area Customer Accounting meeting sponsored by H. P. Rabey, Savannah Gas Company, was held in Savannah on November 9.

Last round table meeting of the association year was the Accounting Management meeting held in New Orleans February 21-22. Sponsored by Luke Patrick, the meeting was attended by 42 representatives of member companies.

Who's Who in SGA's 1957-58 Section Committees

Accounting Section

L. V. Patrick, *Chairman,* Transcontinental Gas Pipe Line Coporation, Houston, Texas.

R. R. Allen, *Vice Chairman,* Oklahoma Natural Gas Company, Tulsa, Oklahoma.

F. M. Featherstone, Jr., *Immediate Past Chairman,* Mississippi Valley Gas Company, Jackson.

Fred K. Macdonald, *Past Chairman,* Texas Illinois Natural Gas Pipe Line Company, Chicago, Illinois.

Distribution Section

S. V. O'Lenic, *Chairman,* Chattanooga Gas Company, Chattanooga, Tennessee.

J. H. Lambdin, *Vice Chairman,* Mississippi Valley Gas Company, Jackson, Mississippi.

W. B. Hambright, *Immediate Past Chairman,* Atlantic Gas Light Company, Atlanta, Georgia.

B. F. Worley, *Past Chairman,* United Gas Corporation, Shreveport, Louisiana.

Employee Relations Section

D. A. Hardesty, *Chairman,* Texas Illinois Natural Gas Pipe Line Company, Chicago, Illinois.

Thad B. Sanders, *Vice Chairman,* Transcontinental Gas Pipe Line Company, Houston, Texas.

Ralph E. Allen, *Immediate Past Chairman,* El Paso Natural Gas Company, El Paso, Texas.

D. W. Weir, *Past Chairman,* Arkansas Louisiana Gas Company, Shreveport, Louisiana.

Sales Section

R. P. Hill, *Chairman,* MidSouth Gas Company, Little Rock.

Charles G. Barndt, *Vice Chairman,* Lone Star Gas Company, Dallas, Texas.

L. Proctor Thomas, *Immediate Past Chairman,* Houston Natural Gas Corporation, Houston,

J. J. Sheehan, *Past Chairman,* Piedmont Natural Gas Company, Inc., Charlotte, North Carolina.

Transmission Section

S. Orlofsky, *Chairman,* Gulf Interstate Gas Company, Houston, Texas.

N. P. Chesnutt, *Vice Chairman,* Southern Union Gas Company, Dallas, Texas.

L. C. Poindexter, *Immediate Past Chairman,* United Gas Pipe Line Company, Shreveport, Louisiana.

Thomas S. Bacon, *Past Chairman,* Lone Star Gas Company, Dallas, Texas.

Accident Prevention Council — W. V. Smith

This group operating within the framework of the Employee Relations Section had a busy if not spectacular year. Both semi-annual round table conferences were well attended. The first in Dallas August 3, attracted 33 representatives from 20 companies, and the second, in Birmingham on January 25, was attended by 38 representatives from 26 companies. Sponsoring the two conferences were T. J. O'Donnell, El Paso Natural Gas Company, and James Hickey, Atlanta Gas Light Company.

Although no new major projects were begun during the year, several projects were completed and revisions on others were made. New sound slide film, "Safety in a Natural Gas Compressor Station," prepared by Texas Illinois Pipe Line Company was previewed and released for purchase at the Birmingham meeting. Accident Prevention Manual and Directory which sets forth the council duties, services available, activities for the year, round table summaries, and a directory of accident prevention personnel within SGA was released during the year. Also released was a film exchange for member companies, listing all film, (movie and sound slide) pertaining to accident prevention, that various companies are willing to lend.

Employee Relations Section — R. E. Allen

Employee Relations Section held three round table conferences during the 1956-57 association.

Thirty-five conferees, representing 28 companies, attended the round table conference held in Atlanta, June 29. Chief discussion topics were the Middle Management Course at Texas A & I College at Kingsville, Texas; progress of the training course for first line supervisors; and Lone Star Gas Company's indoctrination and orientation program for both old and new employees.

At the New Orleans conference, September 7, 40 persons attended representing 28 companies. Curtis Smith reported on the Middle Management Course held in July. Informally discussed were various employee relations problems and practices.

Thirty-seven representatives from 25 companies attended the third and final round table conference in Dallas, January 18. Fred Watson, assistant professor of management with the University of Texas, reported on the Supervisory Training Project. Harold Taylor reported on fringe benefit surveys.

Pulsation Research Council

Activities for the year on the Pulsation Project, sponsored by the Transmission section and being carried out at Southwest Research Institute, have been more or less in the nature of "mopping up," since the major portion of this project had been previously completed. Results of the project will be made available to companies other than the participating companies, and in order to protect the rights of participating companies in their use of data developed by the project, particularly any patents derived from the project, SGA has entered into contracts with participating companies.

The project, as conducted by the Southwest Research Institute will terminate May 1, 1957, with only a small amount of additional work to be done.

Pipe Improvement Council

SGA's Pipe Improvement Council under the chairmanship of B. T. Mast of Trunkline Gas Company was organized in 1956. Activities of the council are two phase — first, research into activities past, present, and future by all other agencies and organizations along lines of council objectives and secondly, development and prosecution of any program that might be practical and desirable. Organization of the pipe improvement council is along the same lines as the pulsation research council in that direction of its program and expenses of its activities will be provided by interested participating companies.

SGA Friendship Hours

As Byron said years ago, "Happiness was born a twin," and twins it is this year for SGA's "Good Fellowship." Instead of a single soiree to help folks attending the convention meet and greet, two separate Friendship Hours, hosted by some seven score SGA associate member companies, will be held.

Slated for Sunday evening in the Jung Hotel, 5 to 7 p.m., is the "Warm Up" party, with some 1200 early registrants expected to be on hand.

Monday evening's annual get-together, which nobody ever misses, is scheduled for the Roosevelt Hotel, also from 5 to 7 p.m. Over 2000 are expected for this one.

Both get-acquainted sessions will be strictly cocktails and conversation, with a few crunchies thrown in — no buffet dinners. Increased attendance at the annual meetings, coupled with lack of serving facilities, high prices, and the need for a second "mixer" to help folks get acquainted, brought about the changes from programs of previous years.

With both Sunday and Monday nights set aside for getting acquainted, there shouldn't be any strangers by Tuesday morning.

★ ★ ★

As is customary at SGA meetings, the hosts at the Friendship Hours are the manufacturers and service organizations associated with SGA. Giving them a bit of recognition for the excellent social hours they provide, their names are noted on this page.

Hosts for the SGA Friendship Hours

American Air Filter Co., Inc.
American Cast Iron Pipe Co.
American Gas Journal, Inc.
American Hard Rubber Co.
American Meter Co., Inc.
Barrett Div., Allied Chem. & Dye Corp.
Black, Sivalls & Bryson, Inc.
Bryant Div., Carrier Corp.
Burgess-Manning Co.
Caloric Appliance Corp.
Cameron Iron Works, Inc.
John H. Carter Co.
Catlett Engineers, Inc.
Chambers Ranges, Inc.
The Chaplin-Fulton Mfg. Co.
Chattanooga Royal Co., Div. of the Chattanooga Implement & Mfg. Co.
Cinch Pipeline Equip., Inc.
Clark Bros. Co., Division of Dresser Operations, Inc.
Cleaner Pipelines Co.
The Cleveland Heater Co.
The Cleveland Trencher Co.
The Coleman Company, Inc.
Commonwealth Services, Inc.
Continental-Emsco Co.
C. Lee Cook Mfg. Co.
The Cooper-Bessemer Corp.
Cribben and Sexton Co.
M. J. Crose Mfg. Co., Inc.
Crutcher-Rolfs-Cummings, Inc.
Daniel Orifice Fitting Co., Inc.
Darling Valve & Mfg. Co.
Davison Chemical Co. Div. of W. R. Grace & Co.
Day & Night Mfg. Co.
S. D. Day Co.
Dearborn Chemical Co.
Dearborn Stove Co.
De Laval Steam Turbine Co.
Detroit Controls Corp.
Dixie Products, Inc.
Double Seal Ring Co.
Dresser Engineering Co.
Dresser Mfg. Division
Dura-Vent Corporation
Ebasco Services Inc.
Empire Stove Co.
Esso Standard Oil Co.
F. J. Evans Engineering Co.
Fisher Governor Co.
Florence Stove Co.
Fluor Products Co.
Ford, Bacon & Davis Constr. Corp.
The Foxboro Co.
France Packing Co.
Franklin Supply Co.
R. H. Fulton & Co.
The Garlock Packing Co.
General Controls Co.
General Electric Co., Turbine Division
The E. F. Griffiths Co.
Grove Valve and Regulator Co.
Gulf Oil Corp., New Orleans Sales Division
Hamilton Mfg. Co.
Hardwick Stove Co., Inc.
Hays Mfg. Co.
M. M. Hedges Mfg. Co., Inc.
Hill, Hubbell and Co., Div. of General Paint Corp.
Industrial X-Ray Engineers
Ingersoll-Rand Company
Johns-Manville Sales Corp.
K-F-B Construction Corp.
Koppers Co., Inc., Tar Products Division
Ladish Company
La.-Miss. Pipe Line Corp.
The Lattimer-Stevens Co.
Lennox Industries Inc.
A. M. Lockett & Co., Ltd.
L.O.F. Glass Fibers Co.
Lone Star Steel Co.
The Lubricosos Specialties Mfg. Co.
Lynn McGuffy Co.
Magic Chef, Inc.
Maintenance Engineering Corp.
Massey Machine Co.
Mavor-Kelly Co.
McCabe-Powers Auto Body Co.
Metalbestos Division, William Wallace Co.
Midwest Piping Co., Inc.
Midwestern Pipe Line Products Co.
Milwaukee Gas Specialty Co.
Minneapolis-Honeywell Regulator Co.
Modern Welding Co., Inc.
Motorola Communications & Electronics, Inc.
Mueller Co.
Natural Gas Odorizing, Div. of the Cue Fastener Corp.
J. P. Neill & Co.
Norman Products Co., Inc.
Norton McMurray Mfg. Co.
O'Keefe & Merritt Co.
The Ohio Foundry and Mfg. Co.
Oil Well Supply, Div. of United States Steel Corp.
Oklahoma Pipe Line Constructors
Paramount Supply Co.
The Payne Co.
Peerless Mfg. Corp.
Pipe Line Service Corp.
Pittsburgh Coke & Chemical Co.
Pittsburgh Testing Laboratory
Protecto Wrap Co.
R. A. Ransom
The Ready-Power Co.
Reeves Brothers, Inc., Vulcan Rubber Div.
Reynolds Gas Regulator Co.
Republic Steel Corp.
Rheem Mfg. Co.
Robertshaw-Fulton Controls Co.
Robinson Orifice Fitting Co. of Texas, Inc.
Robinson Supply Co.
Rockwell Manufacturing Co.
Geo. D. Roper Corp.
Rosson-Richards Co.
Ruud Mfg. Co.
Safety Gas Main Stopper Co.
Sellers Engineering Co.
Servel Inc.
M. B. Skinner Co.
A. O. Smith Corp.
The Sonner Burner Co.
Sorg Printing Co. of Texas
Southwest Distributors, Inc.
Southern Cross Foresters
The Sprague Meter Co.
The D. E. Stearns Co.
Stone & Webster Service Corp.
Superior Iron Works & Supply Co., Inc.
Surface Combustion Corp.
The Tappan Stove Co.
Taylor Forge & Pipe Works
Temco, Inc.
Tube Turns, a Div. of National Cylinder Gas Co.
Tulsa Pipe Coating Co.
United Pipe Utility Suppliers, Inc.
Universal Controls Corp.
Utility Appliance Corp.
Vinson Supply Co.
Walworth Co.
Ward Heater Co.
Weaks Supply Company, Ltd.
The Webster Engr. Co.
Westcott & Greis, Inc.
Western-Holly Appliance Corp.
White-Rodgers Electric Co.
Wilkening Mfg. Co.
T. D. Williamson, Inc.
W-K-M, Division of A C F Industries
John Wood Company
Woodward Governor Co.
Worthington Corp.
H. Zinder & Associates, Inc.

Who's Who In SGA . . .

C. M. Smith
Tennessee Gas Transmission Co.
First Vice-President

C. E. Cloud
MidSouth Gas Company
Second Vice-President

W. G. Wiegel
Lone Star Gas Company
Treasurer

D. E. Frieden
Zenith Gas System, Inc.
Secretary

K. H. Turner
Atlanta Gas Light Company
Assistant Secretary

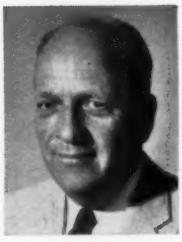
R. R. Suttle
Southern Gas Association
Managing Director

J. H. Collins, Sr.
New Orleans Public Service Inc.
Immediate Past President

F. M. Featherstone, Jr.
Mississippi Valley Gas Co.
Chairman, Accounting Section

L. V. Patrick
Transcontinental Gas Pipe Line Corp.
1957-58 Chairman, Accounting

W. B. Hambright
Atlanta Gas Light Company
Chairman, Distribution Section



R. E. Allen
El Paso Natural Gas Co.
Chairman, Employee Relations Section

D. A. Hardesty
Texas Illinois Natural Gas Pipe Line Co.
1957-58 Chairman, Employee Relations

L. P. Thomas
Houston Natural Gas Corp.
Chairman, Sales Section

R. P. Hill
MidSouth Gas Company
1957-58 Chairman, Sales Section

L. C. Poindexter
United Gas Pipe Line Company
Chairman, Transmission Section

S. Orlofsky
Gulf Interstate Gas Company
1957-58 Chairman, Transmission

M. S. Hitchcock
American Meter Co., Inc.
Chairman, Convention Committee

A. H. Weyland
Arkansas Fuel Oil Corp.
Chairman, Advisory Council

B. T. Mast
Trunkline Gas Company
Chairman, Pipe Improvement Council

W. V. Smith
Oklahoma Natural Gas Company
Chairman, Accident Prevention Council

Directors

R. W. Camp
Consolidated Gas Utilities Corp.
Director

O. W. Clark
Southern Natural Gas Company
Director

B. G. Duncan
Piedmont Natural Gas Co., Inc.
Director

L. H. Ernst
Caloric Appliance Corp.
Director

P. F. Falk
West Tennessee Gas Company
Director

J. F. Forsyth
Mobile Gas Service Corp.
Director

E. C. McGraw
Transcontinental Gas Pipe Line Corp.
Director

W. R. McLaughlin
Rockwell Manufacturing Co.
Director

D. M. Mayne
Consultant
Director

E. J. Newlin
State Fuel Supply Co.
Director

S. V. O'Lenic
Chattanooga Gas Company
Director and 1957-58 Chairman, Distribution

C. R. Reinschmidt
South Atlantic Gas Company
Director

W. K. Sanders
Trunkline Gas Company
Director

M. C. Sumners
Mississippi Valley Gas Company
Director

H. C. Webb
Oklahoma Natural Gas Company
Director

J. A. Wilson
United Gas Corporation
Director

AMERICAN GAS JOURNAL PRESENTS A

Company Portrait

Serving a growing Western Empire for 88 years

Public Service Company of Colorado

IN 1869, seven years before Colorado became a state, the original predecessor of Public Service Company of Colorado started business under the name of Denver Gas Company. This company was founded for the purpose of providing manufactured gas to illuminate the homes and streets of the little town of Denver, which was destined to become the capitol of the new State of Colorado.

Many mergers and consolidations have taken place since; but one of the earliest and most important of these was the consolidation of all gas and electric lighting companies serving the community in 1899 under the name of "The Denver Gas and Electric Company."

During this period, gas was manufactured in "retort houses," where huge furnaces extracted and captured the gas produced by reducing coal to coke. By 1909, the company owned 300 retorts, each hand-fed with coal by a skilled shoveler whose ability to properly scatter the fuel was all-important in the final production of gas.

Few night scenes can equal the picture of the three hundred red-mouthed furnaces belching flames as the hardy, half-naked shovelers bent and pitched to keep ample coal roasting in the retorts. With the introduction of natural gas in Denver, fires that had burned night and day for years under the manufactured gas retorts were banked for the last time.

Natural Gas Arrives

The first major natural gas pipeline to the Denver area was completed in 1928. On June 23, the town border station valve on the southern edge of Denver was opened and the first natural gas from the Texas panhandle, over 340 miles away, passed into the distribution mains in Denver.

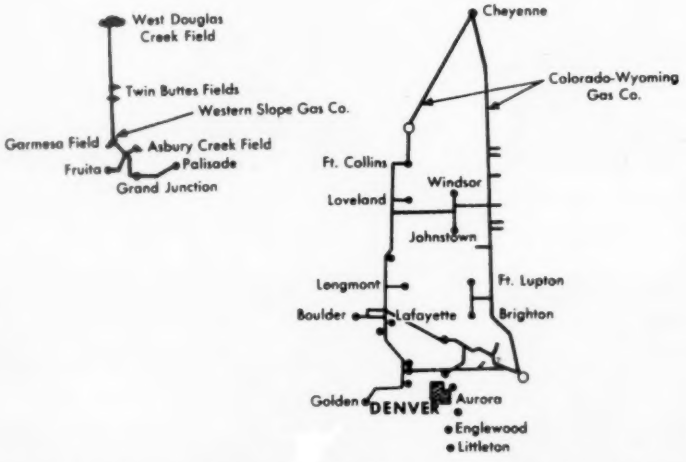
Distributing natural gas was not a new experience as the company already had developed skilled personnel and obtained considerable knowledge in this field in both Fort Collins, Colorado and Cheyenne, Wyoming, where natural gas had been in use since 1925. Consequently, the tremendous job of converting appliances to burn natural gas instead of manufactured gas was handled with a minimum of inconvenience to customers. Thus a pioneering venture had its beginning. Denver and other communities in Colorado were being supplied natural gas through one of the longest natural gas transmission pipelines in the country at that time.

Today there are five gas pipelines to the Denver area, four lines from three of the major natural gas fields in the country and one from a newly developed field in northeast Colorado. In the past 10 years the pipeline capacity has almost tripled. Insofar as the gas supply is concerned, natural gas customers of the company have been in an enviable position. Residential consumption has not been restricted at any time, while most utilites elsewhere have found it necessary to curtail service expansion due to insufficient gas supply.

Gas Supply Outlook Good

Colorado Interstate Gas Company, the company's major supplier of natural gas, has continued to increase its gas reserves, either company-owned or purchased, until today it has approximately 9.0 trillion cu ft, or the equivalent of more than 24 years of supply based upon current requirements and applications for sale pending before the Federal Power Commission.

From all indications, future gas supplies look as bright or brighter than ever; and it is fortunate, for Colorado is in the midst of a modern "Industrial Revolution." Not too many years ago Colorado was almost exclusively an agricultural state. Today it remains primarily agrarian, with ranching and cattle still the backbone of the state's economy, but this condition is undergoing a gradual shift with industry assuming ever-increasing importance.



Area and cities served by PSCC shown above. At left is franchised area of western Colorado; at right, area between Denver and Cheyenne.

Denver — the nation's newest great metropolis, and focal point of gas operations of Public Service of Colorado.

The Industrial Revolution

Within the past few years national firms have spent millions of dollars in developing new sites for their expansion, and Colorado has been a prime target for that expansion. A good labor market, plenty of land, and an ideal climate have all been contributing factors to this development. And with industry have come new people — thousands of them.

They have come to the state that is seventh largest in the nation, which contains 75 percent of all the area of the U. S. above 10,000 ft, and 52 peaks above 14,000 ft. Its dry, sunny climate is as famous throughout the nation as its western folklore, which has made the state a tourist paradise.

The presence of minerals in the mountainous regions of the state has also been a factor in its changing economy. Colorado ranks first in the production of uranium, molybdenum, vanadium, and radium, and second in gold. A number of industrial minerals are also found within the state's borders.

Since World War II more than 300 new industrial and processing firms have entered active production in the state. It has become the focal point of a rapidly changing economic pattern which has been in evidence since the war and now is advancing at an even faster pace.

This, then, is the geography and the economy of the region Public Service Company of Colorado serves.

The company operates entirely within the state, furnishing 80 percent of the natural gas used. It serves approximately 229,000 customers, and through sales for resale serves an additional 11,400 customers. The Pueblo Gas and Fuel Company at Pueblo, Colorado, and the Cheyenne Light, Fuel and Power Company at Cheyenne, Wyoming, wholly owned subsidiaries, serve an additional 35,200 gas customers. Gas operations of the company and its subsidiaries, including construction, operating, maintenance, service and appliance sales require approximately 1500 full-time employees.

Types of Systems

There are several types and combinations of gas distribution systems used by the company, which vary in service areas, pressure carried, and methods of operation. Some of the systems operate at pressures that are varied seasonally, while others operate at pressures that vary continuously and instaneously according to load demands.

An intermediate pressure system transmits gas from gate or town border stations to district regulator stations. It operates at pressures ranging from 40 psi in some cases to as high as 125 psi in others.

The district regulator stations reduce the pressures from the intermediate pressure systems to distribution pressures, which vary from 10-in. water column up to 10 psi. These regulator stations deliver gas into the low pressure feeder and distribution network that carries the gas throughout the streets of the service area.

Pressure Control Problems

Coincident with all the usual problems of postwar growth was the matter of properly controlling the city's distribution main pressures in a fast-changing system. Due to the nature of the company's low pressure gas distribution system, the familiar weight-loaded governor type district regulator was called upon to do a job of pressure control that was beyond its ability. The distribution system calls for automatically increased station delivery pressure over a wide range between minimum off-peak and maximum peak load periods in order to overcome the inherent pressure drop as the gas flows to the ends of the system.

It should be pointed out that practice in the company has been to supply a load area with relatively few district regulator stations of large capacity housed in aboveground structures.

As an example, eight district regulators controlled from one master station had an aggregate peak-hour load amounting to 5,500,000 cu ft per hour, during the last heating season. Establishing a means to serve this load economically justified the expenditures of money to install remote controlled equipment in regulator stations.

During the post war period the company's annual gas sales rose from 17.-336 billion cu ft to 85.744 billion cu ft,

Company representative measures customer's house for installation of a new heating system. With availability of natural gas in suburban areas, the task of measuring for house heating conversions is major part of salesman's job.

Dispatching room shows intricate telemetering and teletype system that allows dispatcher to control amount of gas being delivered into the system.

Side-boom lowers gas main into trench. Operations such as this have become the rule rather than the exception, as service is extended to urban housing developments.

an increase of 395 percent. Technological advances in district regulators and control auxiliaries were necessary to handle increased peak demands. To compensate for these problems, automatic reset type pressure controllers were purchased and connected to district regulators, modified from weight to gas pressure loading. This has resulted in a safe and efficient method of controlling station pressures through increased pressures and loads.

Natural gas is usually odorized where it enters the intermediate pressure system at the town border station, or in the case of a farm tap, at the main line connection. All gas distributed for resale is odorized.

System Design Features

Practically all the Public Service Company of Colorado low pressure distribution systems are of a design which is based upon fundamental principles of economy not obtainable in the old "low pressure" type system inherited from early manufactured gas operations.

The chief features of these systems that bear on economy are:

(1) Extensive use of small-size (2-in.) distribution mains that at this time constitute about 65 percent of Public Service Company of Colorado's systems;

(2) Use of pressure regulators at the service pipe terminals on customers' premises to permit pressure in the mains to be fluctuated far beyond pressures suitable for gas appliances; and

(3) Use of variable system pressures in proportion to load demand but kept at the lowest pressure to fulfill operating requirements.

The company's low pressure systems are divided into two chief types:

First, systems evolved from the old ones, formerly used to distribute manufactured gas, are operated at pressures ranging upward to 83-in. water column maximum (3 psi);

Second, systems built since the advent of natural gas, consisting largely of welded steel mains with some mechanical joint cast iron pipe. These operate at pressures ranging from 2 to 10 psi.

Older Systems

The distribution systems (83-in. wc maximum) have as feeders many of the same mains that were originally installed for manufactured gas operations. Portions of these networks have been rebuilt and re-enforced to improve operation and increase capacities. They were originally designed to carry only lighting, cooking and incidental water heating loads; but now, in addition, carry the large load required for house heating and commercial and industrial space heating.

The Men Who Guide PSCC's Gas Operations

F. T. Parks

G. W. Thomas

F. T. Parks, Vice President of Gas Operations, entered the utility field in 1916 with Cities Service Company. From local manager at Arkansas City he progressed to district manager of Joplin, Missouri, within the following 12 years. In 1928, he joined Public Service Company of Colorado and was in charge of introducing natural gas in Denver and other communities served by the company. He served as a member of the board of directors from 1939 until 1943, when he became a vice president of the company. In 1947, he was re-elected to the board and has served as vice president and board member since that time. A member of Pacific Coast Gas Association and American Gas Association, he is currently serving his second term as director of AGA.

Guy W. Thomas, Vice President of Commercial Operation, has a life-time background in the field of appliance sales and load building operations. A graduate engineer from the University of Iowa, he joined Public Service Company of Colorado in 1919 as a junior engineer. He served as new business representative and sales supervisor in the Boulder and Ft. Collins district offices until 1922, when he transferred to the Denver sales department. He held supervisory and managerial positions in the sales department until 1951 when he became assistant to the vice president and general commercial manager. Thomas became general commercial manager in 1953 and three years later was named vice president of commercial operations.

Capacities of the low pressure networks have been increased through the years by:

(1) Installing additional regulator stations with appropriate extensions of intermediate pressure mains and feeder or "trunk" low pressure mains;

(2) Increasing allowable operating pressures by installing improved service regulators and by improved programs of leak detection and maintenance; and

(3) By improved techniques in district pressure regulation which make it possible to control pressures more closely according to load demands and through a wider range of station volume outputs and pressures.

In connection with (2), company engineers working with a regulator manufacturer devised a modified type of service regulator with high inlet pressure capacity, which was the primary factor in increasing system capacity by allowing higher distribution pressures.

Newer Systems

The low pressure system built since introduction of natural gas were originally designed for proportional pressure operation between 2 and 5 psi. With the widespread conversion to gas heating and the extensive building program in the years immediately after World War II, it became necessary to rapidly increase system capacities. The required capacity was gained in part by installing additional regulator stations and large "feeder" mains.

In 1947 it was decided to increase maximum peak pressures to 10 psi in these systems from the previous 5 psi limit. This change resulted in a great amount of additional capacity with a minimum of capital expenditures. The change was practical due to development of regulator station equipment capable of operating through this increased (2 to 10 psi) range.

Previous experience also indicated that house regulators already in use on these systems could operate satisfactorily and safely at pressures considerably above 10 psi inlet. Because these systems were relatively new and well maintained, the increase in maximum pressures offered no particular problem from increased leakage.

Corrosion Program

The problem of corrosion protection in a distribution system that includes all kinds of pipe, construction practices, and soil variations is a trying one. Recognizing this, a Maintenance Engineering Section was organized in 1948 in order to provide a coordinated program within the company to combat corrosion. Results of this activity have succeeded in lengthening the life span of steel mains and has developed a reduction in maintenance cost on those sections which have cathodic protection.

The use of plastic pipe during the past five years has led to an increased efficiency in the renewal of services and speeded the installation of new services.

Planning Ahead

At the end of 1955 the company had 3065 miles of 3-in. equivalent distribution main in service. To make certain that system capacities and future re-enforcement schedules are accurate and planned well in advance, the company at present is making use of a McIlroy Network Analyzer. This device, located at Kansas City, provides a means of obtaining load and pressure information electrically that would otherwise require long and tedious computations.

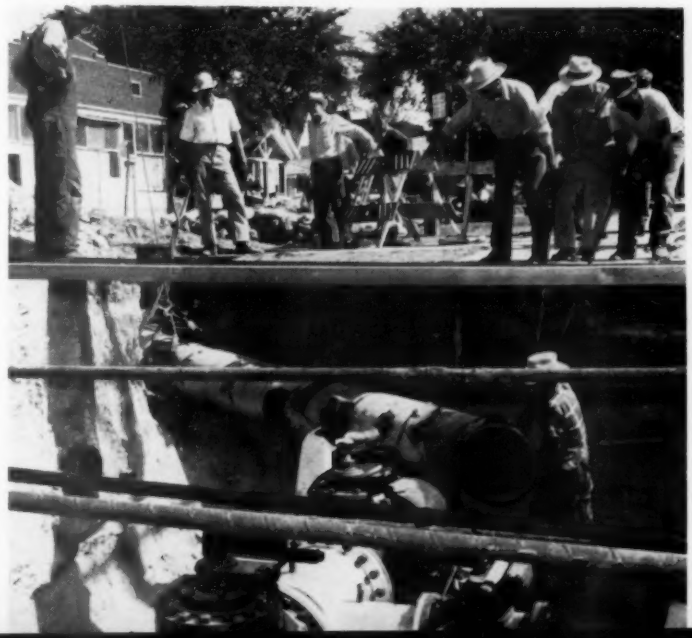
With the company's service area spreading from concentrated residential areas to urban housing developments and sharp customer growth, the necessity of developing an accelerated mechanization program was recognized to maintain prompt dependable customer service.

The first step to meet this pressing demand was the installation of 2-way radio communications in company transportation equipment. Today, approximately 50 percent of the company's service and construction vehicles have 2-way radio installations.

Mechanization Program

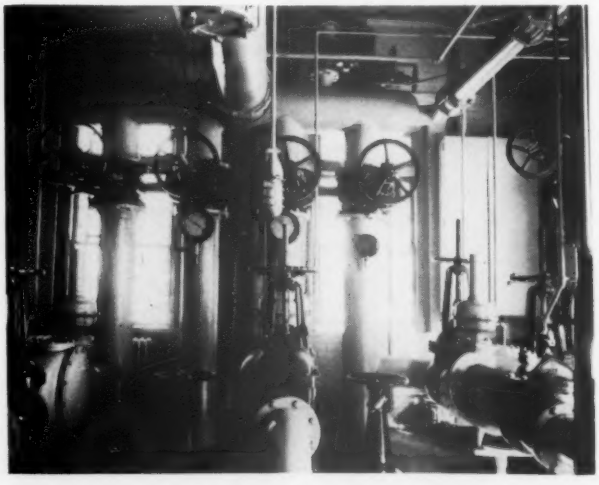
Another important phase was a

Service crews installing 26-in. valve on the intermediate pressure system. Installations of this nature permit company to keep ahead of rapidly increasing customer demands.



Hot rod trencher, one of 11 utilized to meet post-war growth in customers. Digging a 10-in. trench, this machine is used on mains and services up to and including 6-in. pipe.

Group meetings of all salesmen are held periodically so members of sales force will be informed of new and improved appliances handled by the company.



Interior view of above-ground regulator station. These stations, located throughout the distribution system, allow company to meet demands of customers that last year amounted to 265,000,000 cu ft of gas on the peak day.

stepped-up program of mechanized equipment for installing gas facilities. During the four-year period of 1953 through 1956, $408,000 has been spent on this program with a new record of $177,000 being spent in 1956.

An indication of the resulting increased capability of gas operations is reflected in the comparable figures for the 1949-50 heating season with those of the 1955-56 heating season. With no increase in personnel, the number of services installed increased from 8718 to 10,253 during this period; and the total feet of main installed rose from 602,000 to 880,000.

This increase in work unit per employee is a result of additional mechanized equipment being purchased during the period. Welders, compressor trucks, trenchers, scoopmobiles, and air tools have been added yearly, and at present, total 250 separate pieces of equipment compared to only 67 in June, 1950.

Meeting Requirements

The post war natural gas picture in the Public Service Company service territory presented demanding and perplexing problems to those individuals responsible for providing customers with adequate and dependable service. Never before had there been such pressure to procure and supply the gas that was demanded by fast developing residential neighborhoods and industry.

The procurement and dispatching of gas for the company's distribution system is the responsibility of the Gas Supply and Dispatching Department, which maintains a 24-hour watch over the gas load on the system.

A modern system of telemeters and teletypes enables the dispatchers to make a minute-by-minute check on system demands, gas pressures, and area weather conditions. A direct line to the U. S. Weather Bureau is maintained, and combined with the use of other available weather services, allows staff personnel to foresee impending bad weather, thereby allowing sufficient time to procure the necessary gas supply and to notify industrial customers on dump load interruptible rates to convert to standby fuels.

Company Organization

To obtain a clear picture of the operating organization of the company, it is necessary to bear in mind that the Denver organization functions both as a general administrative and as an operating organization. For gas operating purposes, the company is divided into eight geographical divisions with headquarters at Denver, Boulder, Brighton, Fort Collins, Grand Junction, Pueblo, and Sterling, Colorado, and Cheyenne, Wyoming.

The Denver staff functions as the operating organization of the Denver Division in addition to acting in a supervisory and consultant capacity in the remaining seven divisions. This is due to the fact that approximately 81 percent of the total gas revenue of the company is derived from the Denver District, consisting of Denver and its contiguous areas, where some 74 percent of the customers reside.

Each of the seven divisions is under the immediate supervision of a local resident manager supported by an organization similar to that of Denver, but modified to fit the smaller district.

Sales and Promotions

In the postwar years there was increased advertising both locally and nationally pushing the use of natural gas as a house heating fuel. The success of the promotional activity, which was aided and abetted by the fact that natural gas was and is the cheapest fuel available in the area, is shown by the statistics of growth and heating saturation in the past few years.

In the 16-year period following 1930, some 31,400 residential heating customers were connected to company lines. In the next 10 years, 171,400 customers were added. During this same period the percent of house heating saturation jumped from 40.36 in 1946 to 93.38 in 1955, or an increase of 131 percent.

As a result of the company's high saturation of heating customers there exists a substantial summer valley in gas usage figures. The company is fully cognizant of the importance of the load factor on earning power. Since the peak load occurs during the winter season the Commercial Department is working aggressively to increase summer loads with air conditioning, ranges, clothes dryers, incinerators, and interruptible industrial loads in order to build up the valley that exists at the present time.

Load Building

The Commercial Department devotes practically its entire time to load building and development activities. Included in this department are three separate and important sections.

First, a group of engineers, specialized in the sale of gas and gas equipment to all industrial and commercial users.

Second, a staff of salesmen dealing in gas furnaces and air conditioning units.

Third, a sales crew covering all the homes in the company's service territory, demonstrating and selling high quality appliances such as water heaters, ranges, clothes dryers, and incinerators.

In addition to these groups, a Hospitality House is maintained for the purpose of

(1) Building wider markets for gas appliances by creating an active public appreciation of the services available from gas;

(2) The creation of better public relations by establishing a more personal contact with customers through a home economics service and the education of customers in the problems of providing low-cost dependable gas service.

The company maintains a Dealers and Builders Department, which conducts an extensive promotional and dealer cooperation program for residential load building. Directly, and in cooperation with contractors and builders, this activity promotes every possible use of gas service and the adequacy of customers' installations.

Workmen setting meters for PSCC's newest industrial customer, the Glenn L. Martin plant. Located 10 miles south of Denver, the plant will use 127,000 cu ft of gas per hour.

Looking Ahead

From the pioneering venture started in 1869 has developed a company serving 79 percent of Colorado's natural gas customers. Continued increases in gas sales have resulted in a tremendous construction program and complete modernization of the existing distribution systems, bringing into play the advanced methods of automation and mechanization.

This past growth shows no indication of ceasing, and the future for Public Service Company of Colorado promises to be one of continued expansion with the 1957 construction budget calling for the expenditure of $7,951,000. Reserves proved available for the next 24 years assure Public Service Company of Colorado customers of remaining in as favorable a position — insofar as gas supply is concerned — as any group of customers in the entire country.

In viewing this future Public Service Company of Colorado accepts and acknowledges a four-fold duty:

First, to furnish the people of this region efficient and reliable natural gas service at lowest self-sustaining cost, adequate for their homes, their farms, their work, their industry and their enjoyment.

Second, to maintain attractive, safe working conditions, at good wages for their employees.

Third, to compensate investors whose funds have made possible the development and expansion of their facilities.

And finally, a recognition that Public Service Company of Colorado is a service organization where the human element plays a most important part.

People Make the Difference

While the company recognizes that adequate plant facilities are indispensable, it fully appreciates that the heart of its operations and the essence of good service rests with the men and women who comprise its organization. Its continuous training and educational programs not only cover the many technical aspects of job qualifications but much time is devoted to the relationship of employees of the company with its customers and the responsibilities of the company in rendering such essential public service. ★ ★ ★

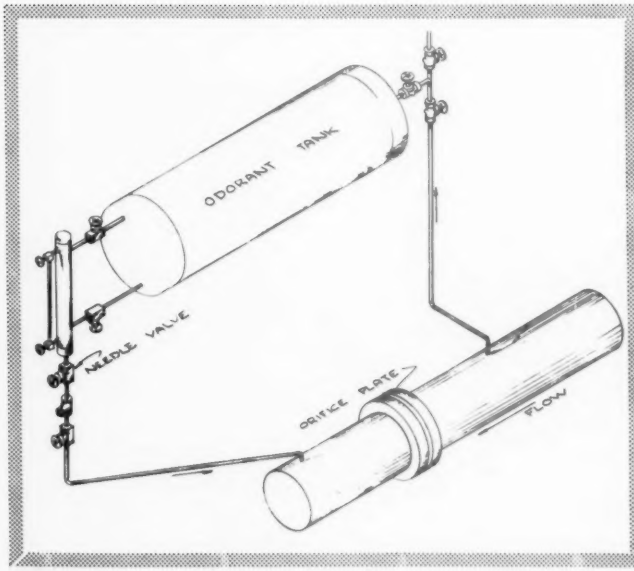


FIG. 1. Drip type odorizer.

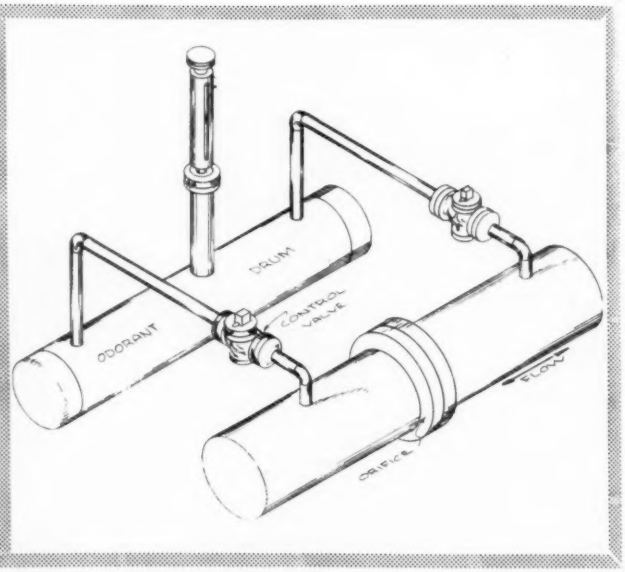


FIG. 2. Sweep type odorizer.

The odorant pump – a new approach to

Automatic Odorization

Harold Burgart
Operating Engineer
Northern Illinois Gas Company

TRULY automatic odorization has come of age. Long a dream of the distribution engineer, it is now being practiced by Northern Illinois Gas Company.

Natural gas first came to NIG's 20-county service area surrounding Chicago in 1931, replacing manufactured gas. Adding odorants in the proper amount to the gas supply has been a continuing duty since then.

Today, Northern Illinois Gas has 34 odorizers within its distribution system, spread widely over the service area. Four basic types of odorizers are in service. They have been selected from the many new odorizing methods developed in a 26-year period, but only after each method was given a fair test.

Complete records maintained through the years helped determine the type of odorizers best suited for the company's operations. Information for these records is obtained by three methods of checking and setting odorizers, including the use of a *Titrilog* for spot checking and initial setting. At unattended stations, the total concentration is checked weekly by gaging the liquid level in the tank, thus obtaining the amount used. At attended stations the concentrations are figured hourly and the rate of odorizing is adjusted to maintain the correct average.

These three methods give a satisfactory theoretical odorant rate for a given period, but they don't insure that the odorant flow will vary proportionately at periods of high or low gas flow.

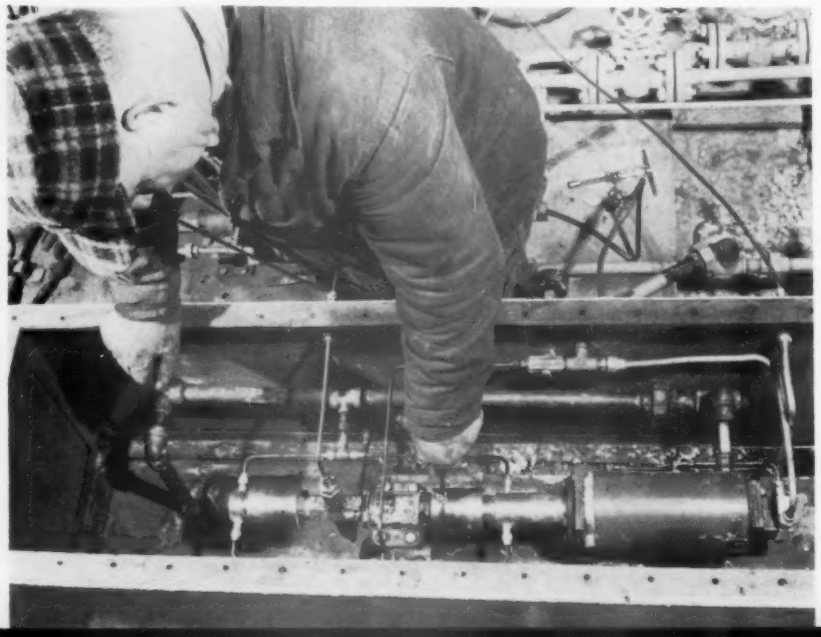


FIG. 3. **New odorant pump type odorizer** is new approach to automatic odorization. Adjustment being made by serviceman to cycling valve timer is simple, does not interfere with operation of pump.

Now . . . for the 3rd Year . . . GEM National Advertising is Selling More Gas for You

These forward looking Suppliers to the Gas Industry support and pay for this program:

American Cast Iron Pipe Co.
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Now in its third year, the Gas Equipment Manufacturers National Advertising Program is helping sell more gas, gas appliances and gas equipment for every gas utility and manufacturer.

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Hundreds of gas utilities are profiting by using reprints of these colorful advertisements as dealer mailings, newspaper ad mats, GEM displays, and GEM price tags.

As the Gas Industry Goes, So Will Go the Business of Every Supplier to the Gas Industry.

For information on how you can participate and profit, write to: Gas Equipment Manufacturers Committee, c/o Gas Appliance Manufacturers Association, 60 East 42nd St., New York 17, N.Y.

What's Being Used?

Types of odorizers now in use by Northern Illinois Gas throughout its system include:

Drip Type (Fig. 1) Odorant tank is located above the gas main. Gas is fed to top of tank, from upstream of orifice plate, and weight of the liquid column plus the difference in gas pressures forces the odorant out bottom of tank thru needle valve and into gas main, downstream of orifice plate. This odorizer is comparatively cheap to install, easy to operate and maintain, and requires no electric power. To get perfect proportioning with this type of odorizer it is necessary to use an odorant that has the same weight and viscosity as natural gas. This is not available. Consequently, both variable weight of liquid above the needle valve, due to change of liquid level in the tank, and variable viscosity of the odorant, due to outside temperature changes, are disadvantages that lead to erratic performance.

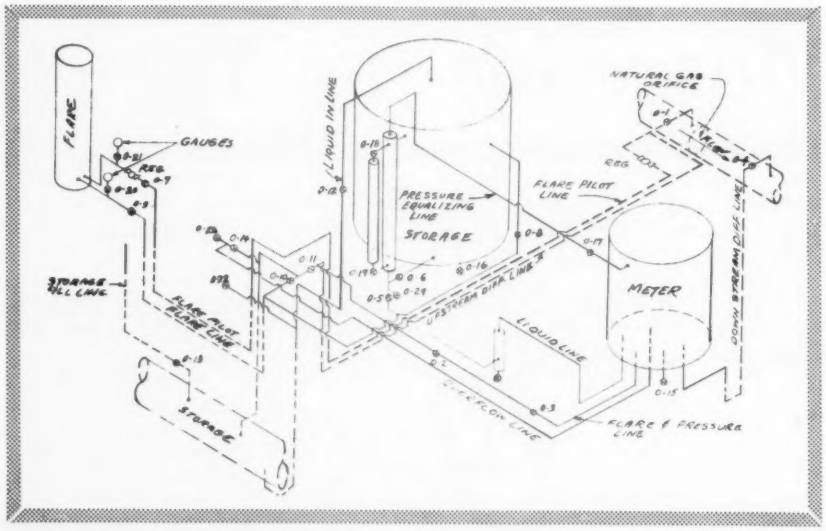

FIG. 4. Dip pump type odorizer.

Sweep Type. (Fig. 2) Odorant tank is located alongside of the gas main. Gas is fed to top of one end of odorant tank, from upstream of orifice plate, passing above odorant thru tank and out other end back to gas main, downstream from orifice plate. Principle of this operation is the same as for the drip type except that, instead of forcing liquid odorant out of the tank, gas passing thru the tank absorbs the odorant and carries it out in vapor state to the gas main. This odorizer is also comparatively cheap to install, easy to operate and maintain, and requires no electricity. To get perfect proportioning, however, it is necessary to get an odorant that has a constant absorption rate in natural gas, regardless of odorant or gas temperature changes throughout the absorption period. This is not available.

Dip Pump Type. (Fig. 4) A dip type pump dips odorant from an odorant-pan and drops it into gas main. Odorant is supplied to odorant-pan from an elevated supply tank and level of the odorant in the odorant-pan is maintained by a float valve. An iron case gas meter, placed in a by-pass around an orifice in the main gas stream, provides power for driving the dip-pump. A restriction in the by-pass line determines speed at which pump will operate. Pressure drop across the orifice in main gas stream and drop across the restriction in by-pass line are the same. Flow of gas thru the meter (and therefore speed of the pump) is proportional to flow of gas through the orifice in the main gas stream. The pump, odorant-pan, and meter are inclosed in a pressure vessel kept at line pressure to simulate "no pressure" conditions. Operating principle of this type of odorizer is similar to the drip type and sweep type except that, by using the meter and dipper, the factors involving weight and absorption rate of the odorant have been eliminated. Also, no electric power is required. Odorizers of this type in service in the company (total: 14), although more accurate

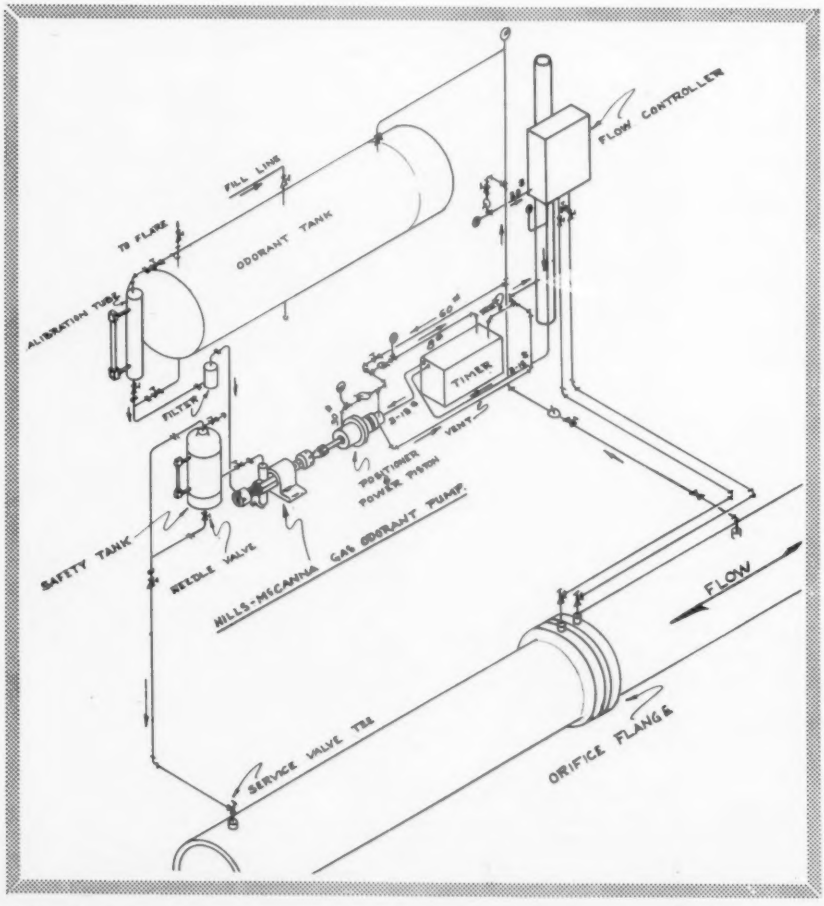

FIG. 5. Automatic flow-proportional system of injecting gas odorant using the odorant pump.

than the sweep or drip type, give a variance that requires constant supervision and maintenance.

Positive Displacement Type. Two positive displacement type odorizers from different manufacturers have been installed by the company. One is a constant stroke (manually variable) gas operated, piston pump with a manually adjusted, electronically controlled, cycling valve, allowing odorant flow to be periodically changed to meet varying flow conditions. Advantage of this type of odorizer is that a positive amount of odorant may be added to the gas main at discretion of the operator. Disadvantage is poor gas-odorant ratios, since accuracy of proportioning is dependent on the operator and rapidity of flow changes. Electric power is required for its operation. The other type unit is an automatic electric motor operated, diaphragm type, piston pump. An accurate measure of gas flow is taken across an orifice by a flow transmitter, which sends a signal to a pneumatic cylinder, varying the length of stroke of the pump. In this way, a positive proportion between odorant and gas flow may be maintained. Disadvantages of this odorizer are the necessity of continuous electric power and the need for a sheltered installation.

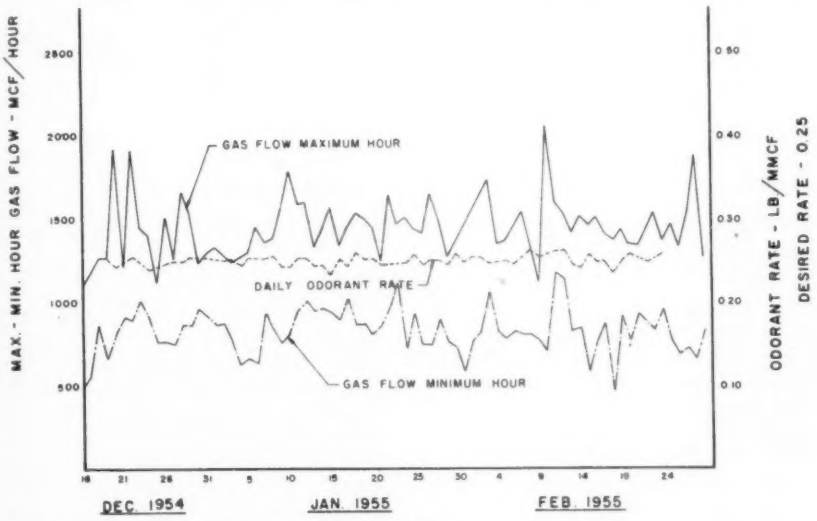

FIG. 6. Odorant rate and gas flow each day of test.

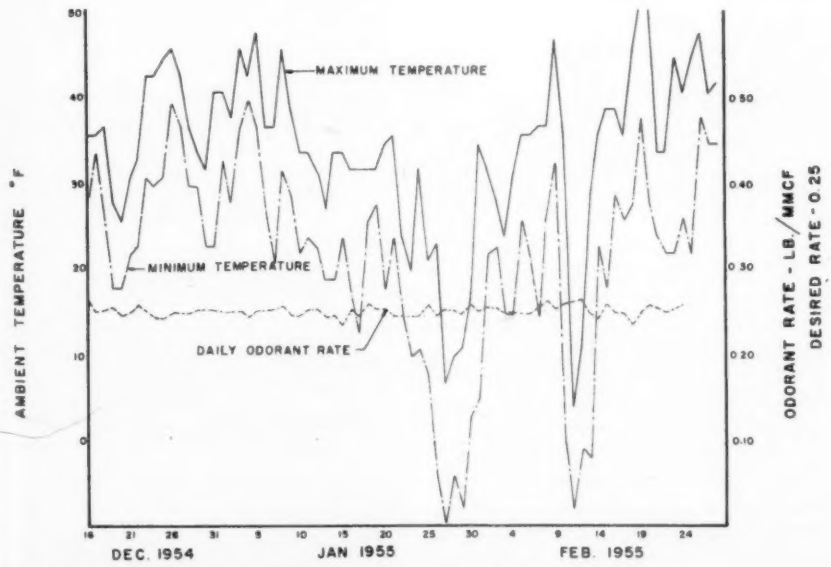

FIG. 7. Odorant rate and temperature each day of test.

New Type Developed

With the thought of incorporating the desirable qualities of the various types of odorizers mentioned, and eliminating the undesirable ones, a new odorizer has been conceived called the *odorant pump* (Fig. 5).

The odorant pump is a positive displacement pump that requires no electric power. Easy to install, it requires no shelter and only a minimum of maintenance. It is essentially a gas operated, automatic proportioning, positive displacement, piston pump. The piston in the liquid end is of constant speed, variable stroke. Stroke is varied or positioned by a standard piston operator.

Accuracy of positioning over the complete range of 3 to 15 psi supply pressure is guaranteed by the manufacturer to within one part in 500. The 3 to 5 psi supply pressure is furnished to the operator, through an automatic cycling valve, by a standard square root extracting pneumatic flow transmitter.

The flow transmitter sends out the 3 to 15 psi signal on a straight line basis, proportional to the flow through an orifice plate installed in the line of flow. The cycling valve is used to reverse the stroke of the pump on a predetermined time schedule.

Vapor Lock Eliminated

In the liquid end, a step down design on the piston is used, allowing a minimum displacement of odorant per stroke. A common fault with positive displacement pumps on pumping odorant is vapor lock. This is caused by gas included in the odorant in the storage chamber, which releases itself from the odorant when it gets to the cylinder. This gas is a small percentage of the odorant but, if the cylinder is large, enough gas can escape to vapor lock the pump.

With the small available volume in the cylinder of the odorant pump at no time does enough gas form to hinder its operation. An outlet check valve is located at the uppermost point of the cylinder, permitting minute gas particles to escape as they form. Incorporated into the packing gland are a V-ring teflon packing and a lantern ring on both sides of the pumping chamber. Vent gas is circulated through the lantern ring to prevent the piston's wiping action from pulling out odorant on either side of the cylinder.

Two sets of opposed diaphragm valves operated entirely with natural gas make up the cycling valve. This valve automatically reverses the stroke of the piston by interrupting the supply pressure to the positioner on alternate half cycles. This allows the positioner

to return to the starting position or zero stroke.

This timer has a minimum cycle of one stroke every two minutes to a maximum cycle of 20 strokes a minute. This entire range is available by turning one adjustment knob. Periodic timing of this valve has shown that, at various settings, it maintains a constant cycle over an extended period of time.

Tested in the Field

First installation of the new odorant pump was in an unsheltered location at an attended station. This permitted as close continuous observation as it would have had in a laboratory, along with experiencing difficulties that exist in field installations. Hourly readings of odorant and gas flows were recorded. (Fig. 6 and 7.)

Over a period of two months, consisting of 60 deg temperature variance, there was a total of 0.8 percent more odorant added to the gas than the desired amount. During this same period, maximum variation for any one day was 4.8 percent. Throughout the test period, there were no adjustments or maintenance on the pump. Only attention necessary was for the operator on duty to take hourly readings on odorant level indicator.

Flexibility

With this new type of odorant pump and controls, it is possible to get positive proportioning of odorant into gas supply mains, within transmitter efficiency range. One advantage of the pump is that adjustments from the original setting need be made only when the flow changes to a point where drop across orifice plate is beyond the flow transmitter range.

When this occurs, it is necessary to install a new orifice plate. At the same time, timing on the cycling valve must be changed so that the pump reciprocates at a different rate. This is done by turning an adjustment screw, without interfering with the operation of the pump. At present, the cycling valve has a 40 to 1 range of speeds.

With this range, the identical pump may be used for most installations. This facilitates stocking of spare parts and simplifies maintenance. If necessary, the pump may be replaced in the field and removed to the shop for required repairs. Each unit of the odorant pump, or the complete pump, may be replaced in minutes without special tools or instructions, adding to both its safety and usefulness.

Records maintained to date on the three odorant pump installations in our system have indicated good odorant control at all flows. * * *

Up in the air — and out of the way are these four automatic storage gas water heaters with aluminum alloy storage tanks, manifolded to provide hot water through a short pipe run to four nearby washfountains at the Syracuse, New York plant of Electric Auto-Lite Company. Plant has four such "area" installations, all fired by natural gas.

DECENTRALIZED
—and Up in the Air!

Getting the most from a hot water supply system designed for an industrial plant . . .

YOU can save a lot of money—both in installation and in operating costs—by eliminating long pipe runs when installing a hot water supply system, reasoned Syracuse, New York, plumbing contractor, the Thomas A. Murphy Company.

Their installation of such a system in the Syracuse plant of Electric Auto-Lite Company is an excellent example of modern design. By decentralizing the supply of hot water—through locating heating units close to the point of use rather than depending on a central supply, they saved considerably on initial installation costs.

Large volumes of water in long pipe runs also cools quickly. It is less costly to run gas and cold water lines for long distances. These two reasons formed the basis for the design used by the Murphy Company.

Task of the firm was to design and install a new and complete hot water supply system in an older plant bought by Electric Auto-Lite, which required extensive revisions before it could be used for the manufacture of auto and aircraft generator sets, windshield wipers, and starting motors.

The plant was first divided into four "areas." Close to the washrooms in the first area, three automatic storage gas water heaters were installed. They were piped into a common manifold to provide 150 F water to three 54-in. washfountains and nine lavatories.

In the next area, four automatic storage gas water heaters with aluminum alloy storage tanks were installed. They also were manifolded together to provide hot water through a short pipe run to four washfountains.

Three more water heaters, similarly installed were used in the third area. The heaters have a recovery rating of 126 gal pr hr at 100 F temperature rise.

A fourth installation was made near the cafeteria — also with three units. The cafeteria units have a two-temperature feature—140 F water for general purpose use, and 180 F water for an automatic dishwasher.

All of the installations have another unique feature—they are up in the air! The one for the cafeteria is located 10 ft up on a stair landing area. This was necessary because Electric Auto-Lite needed a clear floor area throughout the plant for intra-plant lift and materials transportation trucks.

To accomplish this, metal platforms were fabricated and welded to vertical steel beams at a height 20 ft above the plant floors. The water heaters were mounted on these platforms within the skylight areas, with flue connections extending through the plant roof.

All of the units operate on natural gas, provided by Niagara Mohawk Power Corporation.

Long service life is expected for the units by the "up in the air" positioning away from bumps, meddling, and unintentional abuse. * * *

Supply of vaults in central service station plant yard, shown in photo (above). Forms, foreground, photo (right), are used for making poured concrete shells for pre-fabricated "manholes." In background, crew removes a cured and dried, ready-to-go manhole. All of the shells are reinforced with wire.

Ideas at Work

Pre-fabricated Manholes

For Valve Vaults

Dean Hale, *Editor*

PRE-FABRICATED manholes aren't a joke around the Dallas distribution system of Lone Star Gas Company; they are real time and money savers.

An outgrowth of pre-fabricated district regulator vaults, developed by the company in 1954, the mass-produced yet custom-made vaults for valves have been an answer to growth problems in the Dallas area, where plant investment has nearly tripled in the past 10 years, from $14,000,000 to almost $38,000,000.

Three days a week, at the central service station in Dallas, a yardman pours concrete in big steel forms. After drying and curing, the concrete shells are stacked and delivered as needed to new valve locations around the city.

Using the pre-fabricated vaults has cut installation time from three operations to one, and cut costs by 50 per cent. Previously, it was necessary to: (1) Build wooden forms at each valve location, (2) pour the concrete, and (3) remove the wooden forms and install the valves.

Installation of the shells is made at every point where valves are needed—primarily at street intersections where two distribution lines tie together.

By using valves liberally throughout the distribution system, it is possible to shut off gas supply at either side of a trouble spot in making emergency or routine repairs. The system permits workmen to isolate small segments of a system without service interruption to a large number of customers.

Another time and labor-saving device is also used with the vaults. These are "elevator rings," made at a local Dallas foundry. Four sizes are cast—1-in. 1½-in., 2-in., and 3-in. Using them in multiple sizes, Dallas distribution engineers have found a solution to the problem of raising levels to manhole covers to meet street resurfacing requirements.

Prior to the advent of the elevator rings, gas company crews were unable to keep pace with the city's street resurfacing program. New concrete had to be poured at each manhole site to raise the manhole base to the new street level.

With the elevator rings, which can be installed quickly and in advance of the street resurfacing, the crews stay ahead. The rings are also used for alley and sidewalk replacement. ★ ★ ★

Left, **closeup of pre-fabricated vault,** with manhole base and "elevator rings."

Right, **elevator rings** are used to raise manhole base when streets are resurfaced or ground line is raised for some reason.

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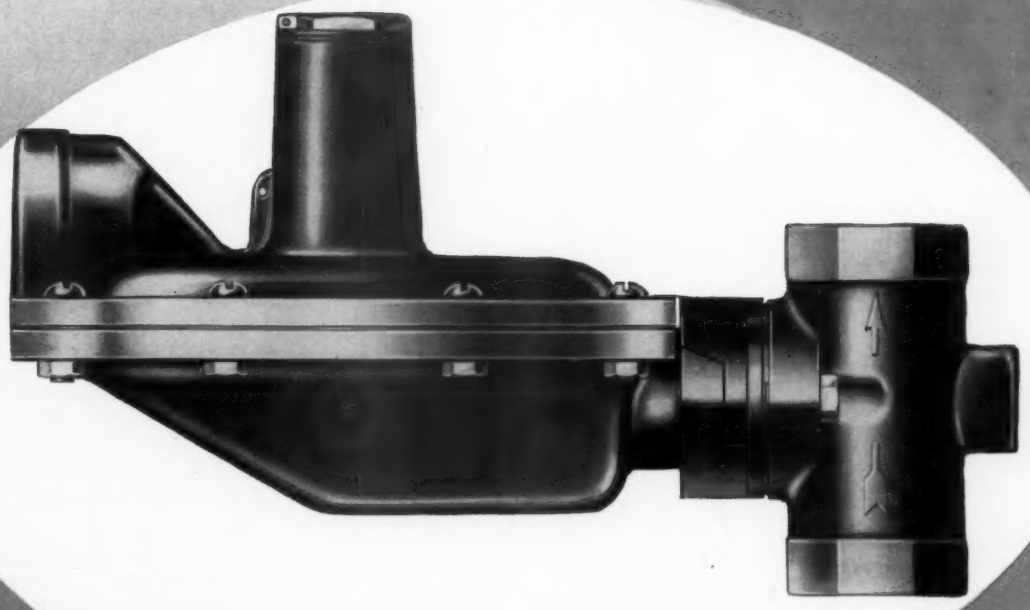

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Eliminate Weather Worries

with Far-Reaching Forecasts and Long Range Planning

Dean Hale, *Editor*

LONG range weather forecasts—used in long range planning—can greatly aid in effecting more efficient operations and better planned sales for gas utilities.

Weather, particularly in the autumn and winter seasons, brings many problems to the utilities. Among the most troublesome of the weather elements are temperature and/or precipitation. When they occur in the right combinations, unusually difficult operating conditions can result and sales-earnings figures can be materially affected.

So how do you get reliable prognostications about the weather—and particularly, about those troublesome combinations of elements and when they might occur?

Many types of weather forecasts are available to the gas utilities. Included are both short and long range predictions from government weather agencies, and private weather forecasting services.

Most meteorological forecast procedures currently in use—such as synoptic or those consisting of anomaly patterns, etc.—are useful to some extent on a short range basis for a few days ahead. Generally, however, such methods aren't able to make predictions of weather trends on a long range basis, in periods of six months to one year in advance.

New Concept

Seven years ago, a nationally recognized meteorologist discovered a new concept of forecast technique for temperature (degree-days) that has proven unusually accurate on forecasts up to nine months in advance. Forecasts made in the last seven years, compared to actual conditions, exhibit an extremely high degree of reliability.

Discoverer of the concept, Lyle E. Brosché, is a meteorologist with over 20 years' experience. A fellow with a flair for finding facts, he devoted considerable time to specializing in long-range temperature and precipitation forecasts. As a result of his studies, he introduced The Brosché Method in 1950 to the fuel oil trade. Considerable development of the method has taken place over the years, resulting in improved forecasts.

Weather Classifications

Essentially, the Brosché Method is based on the fact that weather elements can be divided into four broad categories:

COLD/WET — Temperature normal or below/ with excess precipitation.

COLD/DRY—Temperature normal or below/ with deficient precipitation.

WARM/WET—Temperature above normal/ with excess precipitation.

WARM/DRY—Temperature above normal/with deficient precipitation.

COLD/WET Weather

From the operations point of view, the COLD/WET combination brings the most difficult conditions. This is the type of weather that causes gas dispatchers to munch aspirin like salted peanuts.

Great variations in consumption are more likely to occur. Increased demand when least expected may cause low pressures and jeopardize customer supply when most needed. Interruptible customers may be faced with cut-offs on extremely short notice.

To the maintenance department, it may mean heavy snows and icing conditions, putting a severe strain on equipment and crews. Floods may be prevalent as an aftermath of this combination, particularly if the latter part of the winter experiences a sudden switch to unusually warm conditions.

WARM/DRY Weather

On the other hand, the WARM/DRY category offers the most favorable operating conditions. There are a minimum of severe weather conditions to tax maintenance and construction crews, and the normal supply of gas, in combination with storage or peak-shaving facilities is usually adequate for the colder periods.

WARM/WET Weather

From a sales and earnings point of view, the most undesirable situation is the WARM/WET category, where consumption is relatively low and operating costs high. Even though conditions are warmer than normal, the chance of heavy snows and icing are great, since temperatures are still usually low enough to produce these conditions (depending, of course, on latitude location).

COLD/DRY Weather

Everyone is happy with the COLD DRY category—for it offers the most favorable condition for sales and earn-

FIG. 1. Temperature/Precipitation Combinations.

NEW YORK CITY

Year	October—December Temp.	Precip.	Classification	January—March Temp.	Precip.	Classification
1951-52	47.0+0.7	16.1+6.9	warm/very wet	37.7+2.3	11.5+1.3	warm/wet
1952-53	47.0+0.7	7.2—2.0	warm/dry	39.7+4.3	15.5+5.3	very warm/very wet
1953-54	50.0+3.7	10.3+1.1	very warm/wet	37.6+2.2	6.5—3.7	warm/very dry
1954-55	47.5+1.2	10.7+1.5	warm/wet	35.4 0.0	8.0—2.2	cold/dry
1955-56	44.6—1.7	12.0+2.8	cold/wet	35.8+0.4	12.2+2.0	warm/wet
1956-57	48.8+2.5	11.4+2.2	warm/wet	36.1+0.7	6.9—3.3	warm/dry
			CHICAGO			
1951-52	38.0—2.5	9.2+2.4	cold/wet	31.6+1.8	6.2+0.1	warm/wet
1952-53	41.3+0.8	5.1—1.7	warm/dry	33.4+3.6	7.0+0.9	warm/wet
1953-54	45.3+4.8	6.1—0.7	very warm/dry	33.4+3.6	8.5+2.4	very warm/wet
1954-55	43.2+2.7	15.6+8.8	warm/very wet	30.3+0.5	5.0—1.1	warm/dry
1955-56	39.1—1.4	7.4+0.6	cold/wet	31.4+1.6	3.7—2.4	warm/dry
1956-57	44.7+4.2	2.9—3.9	very warm/dry	29.9+0.1	5.8—0.3	cold/dry

LEGEND

1. Temperature in degrees Fahrenheit.
2. Precipitation in total inches and tenths.
3. Plus or minus figures immediately following temperature and precipitation indicate departures from the normal.
   Minus — Below normal temperature and dryer than normal precip.
   Plus — Above normal temperature and wetter than normal precip.

ings. Maintenance and operating costs are down, and degree-days, requiring consumption of gas for heating purposes, are high. There is usually a minimum of snowfall and icing, which means less wear on heavy equipment. Overtime for maintenance crews is also at a minimum. Less expense and greater revenue are realized with this combination, paving the way for higher profits.

Examples of these four combinations are shown in Fig. 1, which lists actual conditions for Chicago and New York City for the past several years. Each of the periods shown are for three months, paralleling closely the fall and winter seasons.

Making Long-Range Plans

To be most effective, any planning that utilizes long-range forecasts of weather trends must begin at least six months—and if possible, a year—in advance. This long range program can then be tied to a short range program of a few days to a month or two in advance, depending on company needs.

Any weather information utilized must be reasonably accurate, although it could be of a more generalized nature for purposes of a very long range study. One source of information used by some companies is the U.S. Weather Bureau "normals," which are the averages of the various elements over a given period of time. Present normals are computed from the period of 1921 to 1950, a 30-year period. There is no assurance, however, that the same general trend will persist for any period into the future.

And, because of the range (highest and lowest occurence of record), it is necessary to provide for extreme variations from normal, making the "normals" impractical for planning use.

As an example, it is not uncommon to find large variations of 15 to 20 percent for total degree-day six-month periods from October to March. A planned program using "normals" could experience a complete reversal. For the same period from 1921-1950, a considerable error of 10 percent or greater has been found to occur on a frequency of 20 to 25 percent of the time. Fig. 2 illustrates other errors in a comparison analysis.

FIG. 2. Brosché Method Degree-Day Forecast Accuracy Since 1952 For Period October thru March

	1952/53	1953/54	1954/55	1955/56	1956/57	Average accuracy
Chicago	97%	98%	99%	92%	99%	97%
New York City	99%	98%	100%	92%	98%	97%

Degree-Day Comparison Analysis of the Brosché Method vs "Normal" For Period October thru March

	% of cases since 1920 with "normal" error 10% or more.	Maximum "normal" error since 1952	Max. Brosche Method error since 1952	Total accumulated degree day error since the 1952/53 heating season (October thru March) normal	Brosche Method
Chicago	19%	14%	8%	1954	823
New York City	25%	12%	8%	1550	566

NOTE: The "normal" used is the U.S. Weather Bureau normal for the period 1921-1950.

Brosche' Method Accuracy

Long range predictions, as made by Brosché, giving forecasts on the various categories, i.e., COLD/WET, COLD/DRY, etc., are valuable in planning for all utility departments. When supplemented with short range forecasts, they help provide an excellent yardstick for making important decisions in periods of widely fluctuating weather conditions.

Brosché method forecasts are made twice yearly, on July 15 to cover two quarterly periods — October through December and January through March, and on January 15 for April-June and July-September quarters.

Each forecast consists of the total degree-days expected for each period (autumn and winter), and also give three-month precipitation totals categorically as "very dry, dry, wet, or very wet." Forecasts are issued for particular cities or as area forecasts.

Short range temperature predictions are also issued, showing average temperature by two-week periods up to six weeks in advance.

Brosché is quite justifiably proud of this method of making these long range forecasts, which exhibit unusual reliability, as shown in Fig. 2. His achievements in the field of meteorology present some idea of the caliber of the man who has worked studiously in perfecting the method.

Most of his 20 years as a meteorologist have been spent actively with Pan American World Airways, including that of senior meteorologist in charge of the New York transatlantic forecast section, and more recently, as station operations manager for Pan American at Detroit.

During World War II, he was special agent on loan to the U. S. Weather Bureau to supervise and instruct personnel in the preparation of transatlantic forecasts for use by commercial and allied military aircraft operations.

He originated and developed the "average drift-correction method" of air navigation, which is a combination meteorological-navigational technique for obtaining shorter flight times and thus increasing the safety factor and payloads. He has won national awards for this achievement—first prize in the National Imagineers contest in 1949 and first prize in the National Meteorological contest sponsored by the Air Transport Association of America in 1948. ★ ★ ★

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Methods of Drilling for Gas and Oil

Part 1

UNTIL a hole has been made deep enough into the earth to explore all of the possible horizons that may contain gas or oil, no one knows whether production can be had at any given site. Geology may minimize the chances of failure but only an adequately drilled and tested well can bring success. For this reason, great emphasis has been placed on the methods of drilling for gas and oil since this activity first became commercialized.

There are two principal methods of drilling that have evolved: *Cable tools* and *rotary tools*. Oldest of these methods, the cable tool, originated with the Chinese. It is very simple. A hole is merely pounded out by the raising and lowering of a heavy, chisel-like cutting bit. You may have seen or used a star drill for making a hole in stone or concrete. With this tool, impact is created by a hammer blow to the butt of the drill shaft. As the hole becomes deeper, fragments broken loose stay in the hole and impede progress until removed. The workman withdraws the bit, from time to time, to blow dust and chips from the hole.

Cable Tool Drilling

In drilling a well with a *cable tool*, it is impractical to either drive the tool down with the hammer or to blow debris from the hole. So the cutting tool is suspended on a rope and raised and dropped repeatedly to drill the hole. Enough water is used in the hole to mix with the cuttings to produce a fluid mud. When this mixture is sufficiently thick, the drilling tool is withdrawn and a bailer is run into the hole. The *bailer* resembles a slender, bottom-filling water bucket used on bored farm wells. Sludge is sucked into the bailer on bottom and dumped at the surface. This process is repeated until the desired depth is reached or until a soft formation or a water sand is encountered.

One of the big disadvantages of the cable tool method is the difficulty of penetrating soft formations. Wall of the hole is unsupported and tends to cave in or slough. To overcome this trouble, it is necessary to run casing through such sections to establish a wall to permit drilling to continue. If several soft formations are encountered, a string of casing will be required at each point to protect the hole. Consequently, the cable tool hole starts with a large diameter to have room for nesting the required strings of pipe needed to reach the projected depth.

A *derrick* is necessary for lifting tools and pipe in an out of the hole. As the maximum length of any single joint of pipe will exceed 40 ft slightly, the derrick does not have to be as high as the average rotary derrick. Independent sheaves in the crown block of the derrick support the drilling line, casing line, and the sand line for hoisting tools, casing, and bailer respectively.

Three *hoisting reels* distinguish the cable tool machine. The *bull wheel* handles the drilling tools going in and out of the hole. The *calf wheel* is used for hoisting and running of casing. The *sand reel* carries the small line on which the bailer and, later, the *swab* is run.

An up and down motion is imparted to the drilling tools by the *walking beam* or by a *spudding arm*. The walking beam, used on the standard rig, operates like a pump jack or see-saw in lifting and dropping the drilling string, attached to the end over the hole. The spudding arm operates by pushing a grooved sheave against the fixed line of the drilling string for raising tools in the hole and then dropping by suddenly releasing the line.

The *bit* is screwed into a heavy stem to impart additional weight for cutting. Immediately above this, in the drilling string, are the *jars*, which permit flexibility in the string and aid in giving a free striking motion. The jars are similar to two huge chain links. This arrangement permits blows to be struck upward so that a stuck bit may be retrieved. This same jar principle is used on certain fishing jobs with rotary equipment to free pipe, drill collars or subs which are stuck in the hole. The jars may be weighted from above by a *sinker*, which is a long, cylindrical joint of solid metal. The complete string of drilling tools is surmounted by a rope socket to which is attached the *drilling line*.

When things are lost in the hole, *fishing problems* are created that are not too different from those encountered in rotary drilling. Recovery of the drilling line itself and, subsequently, the drilling tools is the most frequent variation. If the "fish" cannot be recovered or "sidetracked" the hole may have to be abandoned. This means the loss of not only expensive tools but of investment in the hole to that point.

Importance of Cable Tool Method

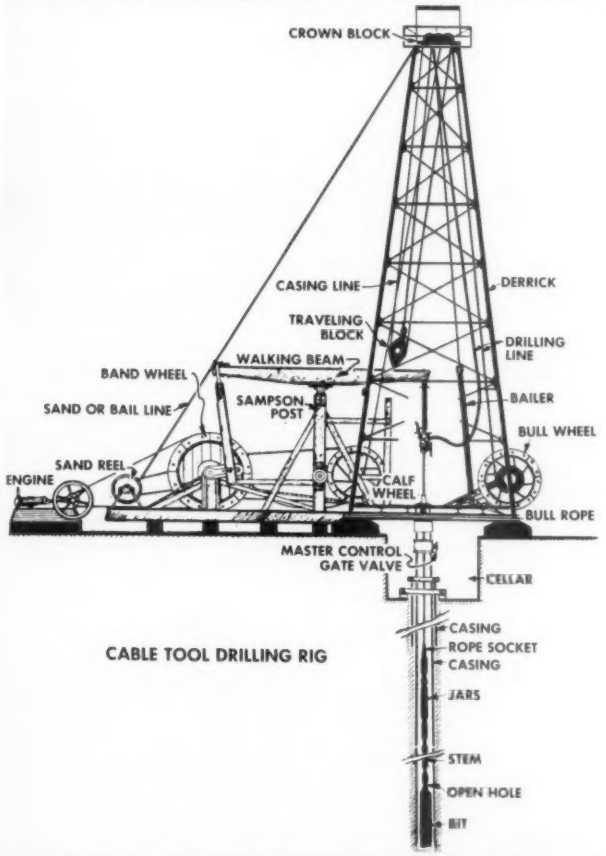
While the importance of the cable tool drilling method has declined there are still many shallow holes drilled by this procedure. Chief advantages of the technique are:

(1) Ability to penetrate very hard formations at relatively low cost;

(2) Full recovery of all cuttings from all formations so that no oil possibilities are missed, and,

(3) Safeguarding the formations from damage (particularly low pressure sections) that might result from columns of fluid as used in rotary drilling.

This third advantage has made the cable tool method desirable for the completion of wells. Consequently, many portable cable tool units or spudders are engaged in well completion work. In many areas the term used to designate the use of such tools in completion is "tailing in." The rotary is used to the top of the producing section and removed. The hole is then bailed or swabbed dry and drilling carried on with cable tools to avoid having the pressure of a hole full of fluid push back and, possibly, seal off the oil in a pay horizon under less pressure than that exerted by the column of fluid.



CABLE TOOL DRILLING RIG

Chief reasons why the rotary method has gradually replaced the cable tool operation are:

(1) Greater speed of penetration (particularly in the softer formations);

(2) Expense of multiple strings of casing required in cable tool practice;

(3) The extreme difficulty of controlling high bottom-hole pressures with cable tools.

There are other disadvantages, such as the difficulty of maintaining straight hole or drilling directional hole, that have caused the cable tool method to lose favor as depth and precision requirements have increased.

Rotary Drilling Method

The *rotary method* derives its name from the fact that a boring, twisting, or rotary motion is employed in cutting the hole. It is similar to a hand drill, drill press, or brace and bit. Because of an ingenious arrangement for circulating fluid, it is not necessary to withdraw the bit to remove cuttings from the hole. The cutting bit is carried on the end of hollow pipe through which fluid is forced downward and out of openings in the bit. After release, at the bottom of the hole, the fluid is forced upward by pressure and carries with it debris from the bottom of the hole. Minute rock fragments, called *cuttings*, are removed from the fluid before the fluid makes the cycle again.

You have no doubt had the experience of forcing the nozzle of a garden hose into the earth and boring a hole by allowing the water jet to wash the dirt out. If you had cut a serrated edge on the nozzle of your hose and could have rotated it as it was forced down you would have had a rotary drilling machine. The refinements in size and design constitute the modern rotary drilling rig.

There must be some way of lifting the heavy pipe, drill collars, and bits used in making the hole. For this purpose, as with the cable tool, a derrick is employed. Because time can be reduced by handling more joints of pipe in a single hoisting, the derricks are built higher. And, because of deeper penetration requirements, derricks are larger and stronger, to hold more pipe when standing in the derrick and for lifting greater weights going in and out of the hole. Derricks are generally of two types: *Standard derricks*, built on the job and dismantled for removal to the next location, and the *jackknife* or *portable* derricks.

Economics were largely responsible for introduction of the jackknife derrick. Rig building crews restricted, through union management, the number of men skilled in derrick erection. The answer was the development of the jackknife derrick that can be moved and erected on the job by regular drilling crew members. The derrick is hauled to the location in sections by trucks. It is bolted together on the ground, in a horizontal position, and the whole derrick is then raised to a vertical standing position by rig hoisting equipment.

Either of the two types of derricks can be skidded intact for short distances without being dismantled or "layed down." This is usually done on offset locations where the terrain is not too rugged or encumbered with obstacles.

The derrick proper sets on a base called the *substructure*. This is a table-like structure used to provide working room below the floor and the rotary table. It permits easy access to the well head and blow-out preventers as they are placed below the rig working area. Upon completion, the Christmas tree can be installed easily and the derrick moved without interfering with the well. The *flowline* for the mud returning from the bore hole can be located in a better position with reference to the mud tanks.

Formerly, when derricks were built on low sills close to the ground, a pit in the earth was required for the installation of all the wellhead equipment. This pit was often filled with mud and water and, sometimes, oil that made the work required there very disagreeable and dangerous. So, high substructures are, in effect, a safety device in keeping with modern high pressure drilling and completion work. It would be extremely difficult to install and maintain drilling gate valves and double blow-out preventers in the old type cellars.

In the top of the derrick is the *crown block* containing several sheaves. These are sheaves or pulleys similar to those used in driving the fan or generator on your automobile.

The grooves are made to fit the large sizes of wire rope used in hoisting. Normal size for medium depth drilling is line that is 1⅛ in. in diameter. Line size increases to 1¼ in. in diameter at about 9000 ft of depth.

Wire line is spooled on the drum of the drawworks, which does the work of hoisting and lowering tools in the hole. After the line passes over the first sheave in the crown block it is threaded through one sheave of the traveling block and so on back and forth until the line is "strung up." Six or eight lines, meaning the use of three or four sheaves on each block, are most commonly used. The end of the line away from the drawworks is made fast at the base of the derrick and is referred to as the *deadline*. It is on this line that the *weight indicator* is fastened to measure the amount of load.

A *hook* is fastened below the traveling block to engage those loads to be lifted. Such things as *swivels* and *elevators* have *bails* (similar to a bucket bail) onto which the hook may latch. The hook usually has a built in heavy spring to absorb the shock of sudden loads. Engagement of the hook with the bails is referred to as "latching on,"

thus giving birth to a common expression in our language.

The *drum* of the *drawworks* can be operated at several different speeds. The outer edges are equipped with brake drums and flanges similar to those on your car except for size. These *brakes* are often cooled by water jackets and are aided by other devices built into the drawworks.

Other integral parts of the drawworks are the *catheads*. These spool-like reels are used for hoisting or moving small loads with the manila rope catline or for pulling the *tongs* (huge wrenches) that tighten or loosen the threaded joints of drill pipe. Catheads were formerly the source of many bad accidents around the drilling rig as they rotated continuously with the drawworks operation and could only be halted by stopping the entire drawworks. Modern catheads are either automatic or entirely under the control of the driller.

Automatic cathead works on a ratchet principle that pulls or jerks the line attached to the tongs only the short distance required to move the tongs approximately a quarter of a turn. Tongs are reset by hand by the floor men for further jerking. The cathead used for unscrewing the pipe is called the *break-out cathead*. The other, used in screwing the pipe together, is referred to as the *make-up cathead*.

The power that drives the machinery of the rotary or cable tool rig may be selected from several sources. Most rigs today are "mechanical," meaning that their prime movers are gas, gasoline, or diesel engines. Steam rigs, with their batteries of boilers (called pots by the workers) held a very prominent place in the past and are still greatly admired for the smoothness of their operation. Steam has been largely displaced because of the heavy expense of moving, inadequate water supplies, high fuel cost, and fire hazard. Great attention is paid to securing the most horsepower for the least weight. This has limited the popularity of electric powered rigs that rival steam in their smooth flexibility of operation.

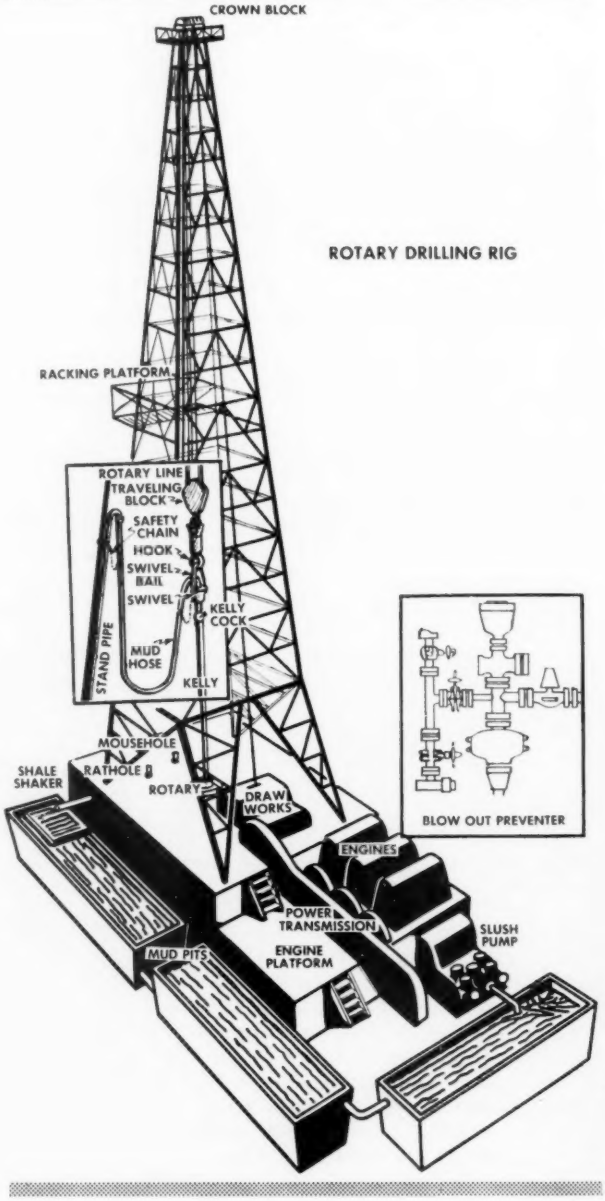
Since the prime movers also drive *slush pumps*, the entire amount of power is not usually moving through the drawworks. Slush pumps or mud pumps require considerable power to keep them pulsing. The pumps are the heart of the circulatory system. Through the suction hose is drawn the mud from earthen slush pits or steel mud tanks. Under pressure, this mud is delivered through the discharge of the pump to the standpipe.

Mud leaves the standpipe at the gooseneck to enter the rotary hose. This hose is necessary for making a flexible connection so the drill pipe may move up and down, within a range of 30 to 40 ft, without interfering with the circulation of mud. The hose may be made of rubber reinforced with steel wire and strong fabric or it may be composed of metal sections of pipe made flexible by special connections.

Mud flows from the rotary hose through the swivel to the drilling string. Swivel is constructed so that the upper portion, attached to the hose, remains stationary while the lower part, fastened to the kelly, rotates freely. This arrangement permits the entire drilling string to be rotated while fluid is coursing through it to the bit.

The *kelly* or *kelly joint* or *grief stem* is the top section of the drilling string. It is made square, hexagonal, or fluted in cross section so that it can be easily gripped by the drive bushings which act as wedges to transfer motion from the spinning rotary table. Round pipe would be hard to hold for rotating without the use of teeth that would cut into and damage the metal.

The kelly is normally longer than any single joint of pipe. It is always the top joint in drilling. As it passes through the center of the rotary table it is held from the sides by drive bushings so that it has to revolve with the table. In this manner a rotating motion is imparted



through the string of drill pipe to the bit on the bottom of the hole. The drive bushings fit loosely so the kelly may be raised or lowered through the table whether the rotary table is in motion or not. This permits the driller to allow the drill stem and bit to progress downward (by releasing the brake slightly) as the rock is cut away at the bottom of the hole. It also allows any desired amount of weight to be applied through the bit.

When drilling progresses to the point where the kelly is "all the way down" (meaning the kelly has moved down through the table as far as it can go), a new joint of pipe is added. Drilling is stopped temporarily while the whole section of pipe in the hole is lifted sufficiently for the kelly to be completely out of the rotary table. This is called "picking up."

At this time, the first joint of pipe below the kelly protrudes several feet above the table. Lifting is halted and *slips* are put into the table around the pipe in the place of the drive bushings which are withdrawn with the kelly. The slips are simply wedges with toothed faces to grip the pipe so it cannot fall into the hole. When the driller is

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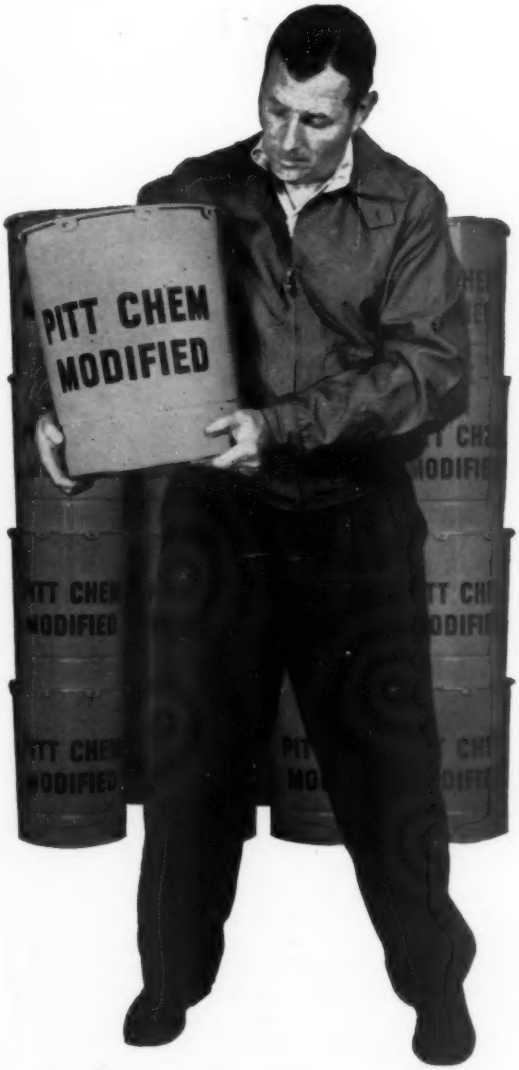

PITT CHEM® TAR BASE ENAMELS

- Standard Grade • Modified Grade
- Plasticized Grade • Hotline
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For Easier Handling and Economy When You Patch or Coat Joints of Mill Wrapped Pipe

You can now obtain popular Pitt Chem Modified and Plasticized Enamels in 75 lb. containers. That means plenty of work-saving, money-saving advantages when you patch or coat joints. For example:

- 75 lb. containers avoid waste—eliminate cutting up a full drum of enamel when there is need for only a small amount.
- Smaller containers permit use of smaller melting kettle. In congested work areas, reduces space requirements for equipment.
- Simplifies inventory problems—eliminates movement of partial drum to and from jobs.
- Ease of handling—containers can readily be moved by one man.
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Chances are these 75 lb. containers of *Pitt Chem* Enamel can help you in *your* streetside operations, too! Write or call for additional information . . . today!

PROTECTIVE COATINGS DIVISION
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COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Drilling rig in Rocky Mountain region. This rig has jackknife derrick. Note pipe racked, indicating crew is making "trip" to change bits.

sure the slips are set, he permits his helpers to unscrew the kelly from the pipe. This is done with the tongs.

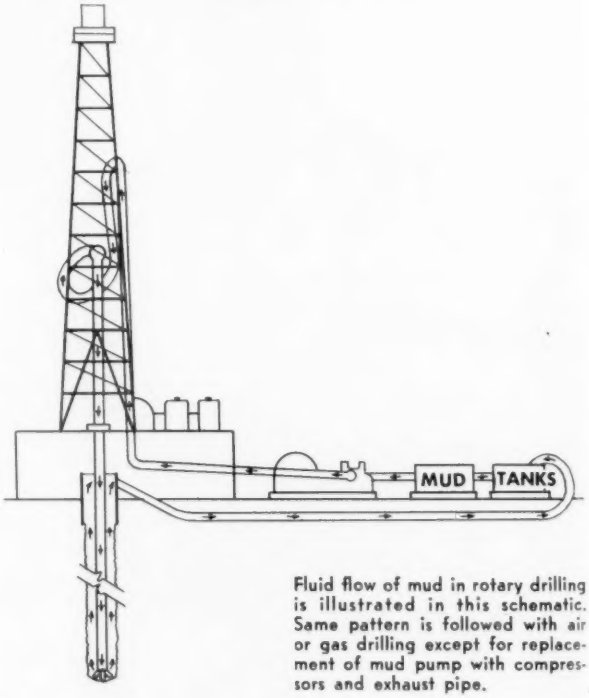
The new joint of pipe to be added to the string for drilling deeper may now be handled in one of two ways. Conventional method is to lower the released kelly with the swivel attached into a shallow hole. This is the *rathole*. It has a protective casing of pipe large enough to sheath the kelly. The rathole is dug and the rathole pipe inserted when the rig is initially set up. With the kelly out of the way, a new joint of pipe is picked up and screwed on to the top of the drilling string. The whole string is then lowered with elevators to the top of the rotary table. Slips are again inserted to hold the pipe while the elevators are detached. The hook is then moved to the bail of the swivel and the kelly is withdrawn from the rathole. After the kelly is re-attached to the drilling string, work goes on as before until another joint is needed.

The *"mouse hole connection"* is a variation of the above that is used to save time in making connections. This employs the use of a second shallow hole, similar to the rathole, wherein a joint of drill pipe is placed, by use of the catline, in anticipation of its need. When it is to be added to the string, the kelly is disconnected, as just described, but instead of running it into the rathole, it is connected to the new joint at the mousehole. Both kelly and the additional joint, having been connected, are elevated so the new joint clears the rathole and swings into position to be screwed into the main drill string.

These maneuvers, in variation, are repeated many times during the drilling of a well. Each time a bit becomes dull and needs replacement, the entire string of pipe has to be pulled from the hole and rerun. To save time, the pipe is generally pulled in *doubles* (two joints at a time) or *trebles* (three joints at a time) and stacked upright in the derrick in rows called *stands*. Going in or out of the hole with the drill pipe is called a trip. A complete "in and out" job is referred to as a round trip.

The bottom joints of the drill string are frequently made with very thick walls for increased weight. These are *drill collars* and they serve a similar purpose to the plumb bob on a string. By placing additional weight in the bottom portion of the drill string it is kept in tension and greater efficiency is achieved. The added weight also permits the driller greater range in the amount of weight that he may carry on the bit. Other advantages are in keeping straight hole and in reducing wear on tool joints (the connections between joints of drill pipe).

Immediately below the drill collars, the bit is attached. Within the two principal categories of hard and soft formation bits are many varieties. A *hard formation or rock bit* has toothed and rotating cutters called *cones*. These revolve on rubber bearings designed to withstand tremendous abuse. Through openings, the mud courses to cool the bit and to wash away the cuttings. With the newer type *jet bits*, the fluid also does a part of the job of cutting the hole. For soft formations, *fishtail bits* are used. These are paddle shaped blades that simply gouge out the rock or shale for washing to the surface.



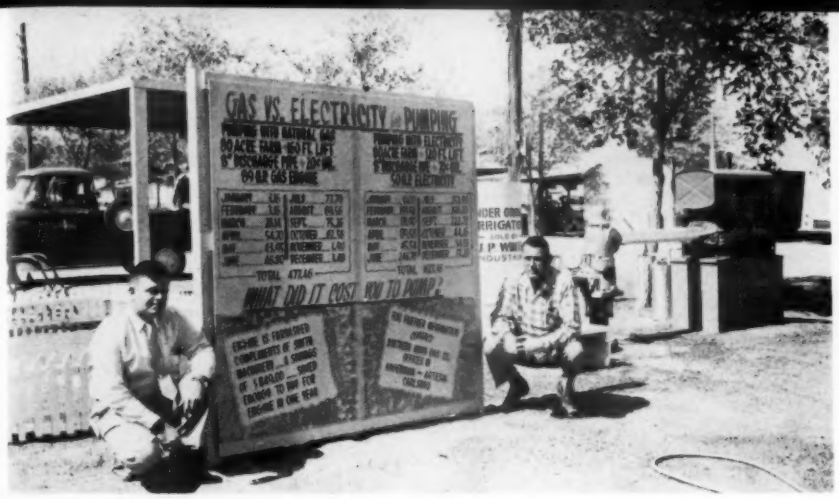
Fluid flow of mud in rotary drilling is illustrated in this schematic. Same pattern is followed with air or gas drilling except for replacement of mud pump with compressors and exhaust pipe.

Uses of Mud

Mud has been frequently mentioned above without any explanation, but it is one of the most important tools used in rotary drilling. Mud, as noted, serves to remove cuttings from the hole and to cool and lubricate the bit. It is also very important as a wall builder for the hole.

By employing a *plastic mud*, a temporary casing is formed in the hole as drilling progresses. This overcomes the difficulty experienced in cable tool drilling with water sands and other soft formations. Mud also is used to control and overcome excessive pressures encountered in the bore hole. High gas pressures are contained within the formation of their origin. The technique of mixing and handling the chemicals and other components of mud is so important and, at times, so complicated that skilled mud engineers supplement the driller's knowledge and practice.

Part 2 of "Methods of Drilling for Gas and Oil" will appear in the next issue of American Gas Fundamentals, Natural Gas.



Gas vs Electricity for irrigation pumping was presented at this Southern Union Gas Company exhibit at the Eastern New Mexico State Fair in Roswell, New Mexico. Manning the exhibit are Hillard Watson, left, utilization specialist and author of the article, and Alex White, SUGCo manager at Hagerman, New Mexico. As result of exhibit, four visitors changed to pumping with natural gas, and many prospects were added to lists.

Southern Union builds its summer load and saves money for farmers promoting . . .

Pumping Irrigation Wells With Natural Gas

Hillard Watson, *Utilization Specialist*
Southern Union Gas Company, Carlsbad, New Mexico

COTTON and alfalfa grow in abundance in the Pecos Valley of southeastern New Mexico, a thriving farm area. But cotton and alfalfa need water if crops are to be made, and the climate of this particular area is comparatively dry. To satisfy their thirsty crops, farmers of the area depend on irrigation; wells supply most of the water.

In recent years, a large number of these farmers have been pumping water from their irrigation wells using electric power. The pumping season comes during the spring and summer months, noted Southern Union Gas Company, a time when gas sales were in their "valley" and a considerable amount of natural gas was available and not being used.

To gas company personnel, it appeared that natural gas as a fuel for pumping engines would solve two problems—increase gas usage in off-season and decrease operating costs for the farmers.

A program of educating the farmers to the advantages of using natural gas was instituted and the company began working with them to develop this new market.

As a result, this market is growing with leaps and bounds, with several hundred irrigation water wells added to Southern Union's lines.

How well the educational program works is illustrated by an exhibit set up by Southern Union at the Eastern New Mexico State Fair. An actual pumping installation, using an engine fueled by natural gas, was combined with a large billboard sign, and company specialists were on hand to provide information.

Comparative costs between the use of natural gas and electricity for pumping irrigation water were featured, both in literature made available and in an actual demonstration.

Actual cost figures, taken from two separate farms located in the same area, with both raising approximately the same amount of cotton and alfalfa, and with all factors as closely similar as possible, gave a comparison shown in the accompanying table.

A review of the figures points out that the savings in one year's operations using natural gas is more than enough to pay for the change from electric powered equipment.

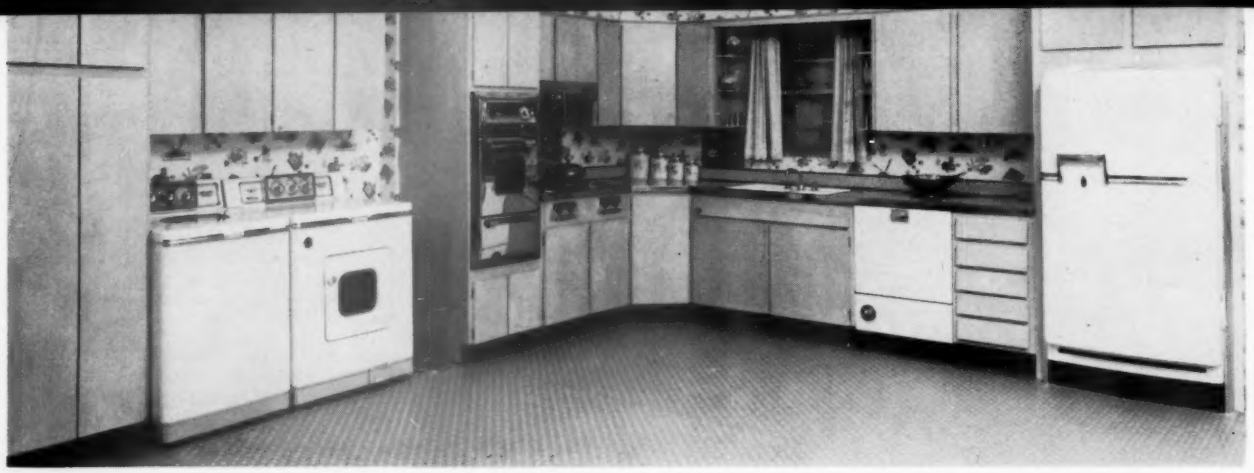
In the Pecos Valley area, water lift ranges from 90 to 150 ft, requiring between 40 and 75 hp. The larger (and deeper) the well, the greater are the savings effected by using natural gas fueled engines.

Among the best salesmen Southern Union has in the area are those farmers who have switched to natural gas—and have cut their costs of operation from one-half to two-thirds. ★ ★ ★

Comparative Cost Figures on Irrigation Well Pumping

PUMPING WITH GAS 80-Acre Farm 160 Ft Lift 8-In. Discharge Pipe 20¢ per Hour 89 Hp Engine		PUMPING WITH ELECTRICITY 80-Acre Farm 120 Ft Lift 8-In. Discharge Pipe 70¢ Per Hour 50 Hp Motor	
January	$ 3.16	January	$ 10.00
February	3.16	February	193.92
March	28.14	March	171.90
April	54.70	April	179.58
May	43.95	May	45.54
June	46.80	June	246.78
July	77.79	July	252.54
August	69.56	August	208.38
September	75.26	September	222.72
October	69.56	October	44.16
November	1.90	November	34.56
December	3.48	December	17.28
TOTAL	$477.46	TOTAL	$1627.36

A Saving of $1149.90 — Enough to Pay for the Engine in One Year!



Packaged all-gas kitchen features modular wooden cabinet units, designed to blend with gas appliances.

NOW: 'Packaged' All-Gas Kitchens

Texas cabinet manufacturer is mass producing a new "packaged" tool to meet electric industry competition

Jan Gartman, *AGJ Editorial Staff*

NOW the gas industry can compete with the "all electric" kitchens! A package deal? Yes — the first mass produced "All-Gas" kitchen priced at assembly line production with custom-made appearance. Mayfair Matchless Gas Kitchens and Laundries are now producing the package deal for gas utilities and dealers. And, the utilities and/or dealers don't carry the inventory.

Mayfair's Fort Worth and Mineral Wells, Texas, plants are building the cabinets to fit specified gas appliances. The package deal includes any combination of listed appliances. A housewife will have a variety of manufacturers from which to select her kitchen apparel — all gas appliances, of course.

Here's how gas utilities will fit into the picture:

Gas utilities — both merchandising and non-merchandising — holding area franchises on Mayfair kitchens may sell direct, or appoint distributors and dealers to handle these kitchens under their supervision.

Gas utilities not wanting to compete with retail dealers and actively merchandise these kitchens at the retail level, may elect to appoint appliance and kitchen dealers to handle retail distribution under the gas utility area franchise.

All orders from appointed distributors and dealers must be placed through gas utilities, but deliveries will be made direct to dealers or installers.

Gas utilities or distributor/dealer organizations will be expected only to display kitchens, or partial kitchens. Specialized personnel are not required for sales.

How will the distributorship work? Mayfair has the answers. Gas utilities will:

- Display a complete or partial "All-Gas" kitchen.
- Advertise the kitchens in conjunction with Mayfair and the appliance manufacturers.
- Distribute literature on the kitchens through their sales and service organizations or their dealers.
- Prospects can visit the gas utility or their dealers to select the cabinets and appliances. (A good-will builder in any utility man's language.)
- Prospects will then be visited by a retail dealer who will estimate type and number of cabinets and appliances needed.
- Prospects will be quoted price of packaged deal from established price lists set up by the local gas utility, plus cost of installation.
- Dealers should estimate kitchens and laundries without charge to the utilities.
- Service on the kitchens should also be done by the dealer without charge.

Franchised gas utilities need to change standard routine very little to offer their customers complete package all-gas kitchens and laundries. Most utilities now have kitchen displays and office or sales personnel to talk about the merits of gas appliances.

No inventory is required of the gas utility or their dealers. Mayfair will inventory complete kitchens and appliances. Appliances may be purchased from Mayfair, direct from manufacturers, from local sources, or taken from dealer stock.

Financing of the all gas kitchens can be handled, in most cases, through the franchised gas utility, FHA Title 1 loans, or by other financing organizations. Financing of the kitchens and appliances on gas meter bills is another feature expected to increase the popularity of the new all-gas kitchens — where this plan is available.

Where did the "all gas kitchen" idea come from?

Actually, it's not new. Mayfair, however, is the only company to do it on a mass produced basis.

An idea created by a service man for a Texas gas utility bore fruit for the all-gas kitchen. The service man, adjusting a gas oven, sold a housewife on the merits of an automatic gas clothes dryer merely because he saw an automatic washer in her kitchen, but no automatic gas dryer. He became a salesman and convinced the housewife that she needed a gas dryer. Fortunately the service call was to the home of a man who was, and had been for sometime, meeting with leaders in the building industry seeking something new and reasonably priced for kitchens.

After much kicking around, the all-gas kitchen idea was born. Why not? Didn't the electric industry make a "killing" with the mass produced hous-

Mayfair Cabinet Corporation is one of several affiliated cabinet manufacturing companies that have been making wood cabinets for sale to builders and contractors only.

NEW SUPER-CLAD THERMOCOUPLE

GENERATES GREATER VOLTAGE OUTPUT!

- *Interchangeable on <u>all</u> standard pilots*
- *Costs no more*

The *new* Grayson Super-Clad couple generates greater electrical output than standard thermocouples to eliminate service calls caused by needless outages... insures trouble-free, positive holding power... fails-safe only when the pilot goes out! And yet, Grayson's *new* Super-Clad couple costs no more than ordinary, standard thermocouples! Compare the advantages of the *new* Super-Clad—write today for a free sample.

EXTRA LENGTH NUT MAKES INSTALLATION EASIER... QUICKER!

FOR FREE SAMPLE...
WRITE TODAY (DEPT. 5A)

1. **SUPER-CLAD COATING**
(Nickel-Zinc) "all over" plating protects copper from heat, prevents oxidation for more positive operation.

2. **IMPROVED THERMO-ELECTRIC ALLOYS**
in the heart of the thermocouple for greater electric output, more positive operation.

3. **TWENTY-FOUR COOLING FINS**
create a greater temperature differential for efficient, more positive operation.

4. **EXTENDED COLD JUNCTION**
greater voltage output than standard thermocouples for more positive operation.

5. **TIN PLATING ON CONTACT END**
for better electrical conduction... prevents oxidation for more positive operation.

6. **LOCK WASHER**
maintains tight fit for positive operation.

7. **NON-SHRINKING INSULATOR**
insures a tight fit, reduces "cold day" outages caused by changes in ambient temperatures.

Mr. Controls

Robertshaw-Fulton
CONTROLS COMPANY

GRAYSON CONTROLS DIVISION
Long Beach, California

ing projects springing up all over the country by offering a "packaged deal" to builders and contractors — without any individual salesmanship by manufacturers. If they could offer it — why not the gas industry?

The kitchen planners and their associates took a look at what was available for packaged all-gas kitchens. They found they had good hardwood cabinets, sinks, and fittings, range hoods, intercom system and the cabinets for making built-ins out of free standing Servel refrigerators. To complete the package gas kitchens, national brand appliances were included:

Free Standing and Built-in Ranges and Ovens
Disposal Units
Dishwashers
Automatic Clothes Washers
Modern Automatic Gas Dryers
Gas Incinerators
Gas Water Heaters

To the planners this comprised a perfect package — one that could be purchased as a complete package or as individual components. A kitchen that will fit any specifications for either new homes or remodeling out-dated kitchens.

The new Mayfair cabinets are constructed of the finest quality hardwood. They are modern in design, yet have a distinctive custom appearance. A complete range of modular unit cabinets are offered — not just a few kitchen designs. Tray racks, cabinets, lazy susans, etc. are standard items. Any and every family room kitchen can be equipped with matchless gas appliances.

How About Delivery?

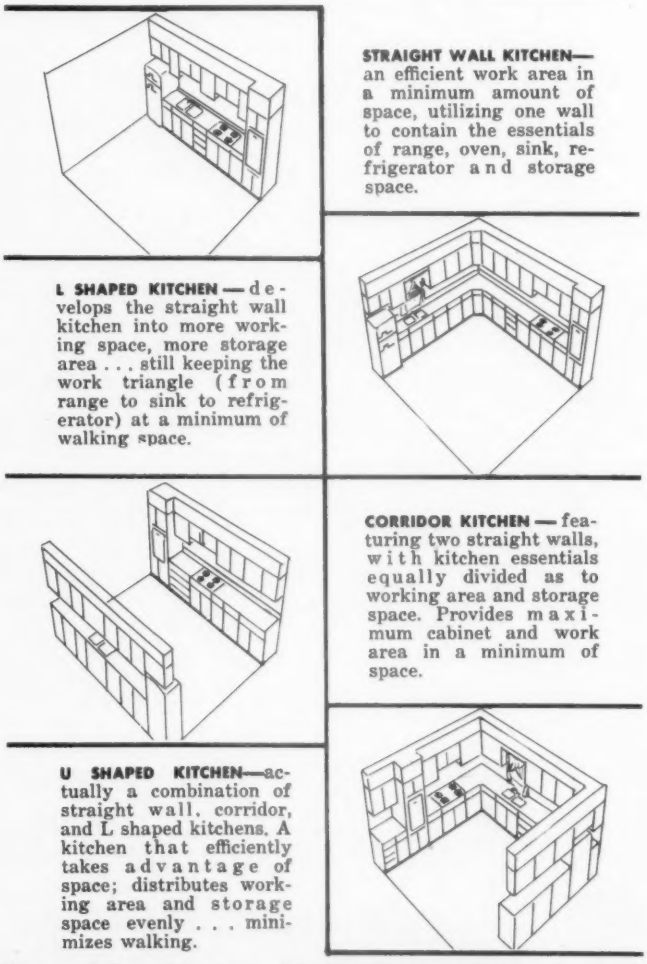
Standard stock cabinets and accessories will be available for delivery from stock. Countertops, if desired, will be custom manufactured to installer's specifications and delivered as fast as possible. Delivery of appliances would depend upon individual utility setups.

Kitchen Specifications

Complete specification sheets are available for contractors and builders. Kitchens are simple to install — cabinets come ready to slip into place. There are cabinets, sinks, and accessories to fit any requirements in any size room. Built-in gas oven cabinets are available to accommodate all gas built-in ovens, including 30-in. ovens. All wall and base cabinets are available in a line of standard sizes. Standard finish is a modern "Platinum" — a natural birch finish highlighted by a light silver tone. Cabinets will also be available in light yellow, pink, beige, soft green, white, and natural birch.

Drawer fronts are of modern "tear drop" design and all drawer pulls are of the recessed type. Cabinet doors feature underside recessed pulls and concealed hinges. No hardware is visible, except for the small cutout for the concealed hinges. Cabinet drawers use special furniture type hardwood guides. Drawer bases and cabinets have standard recessed bottoms for ample toe space. All doors are of the hollow core type.

All kitchens carry a standard one year warranty acceptable to FHA and the Veterans Administration — warranty is valid only if approved gas appliances are installed.



STRAIGHT WALL KITCHEN— an efficient work area in a minimum amount of space, utilizing one wall to contain the essentials of range, oven, sink, refrigerator and storage space.

L SHAPED KITCHEN — develops the straight wall kitchen into more working space, more storage area . . . still keeping the work triangle (from range to sink to refrigerator) at a minimum of walking space.

CORRIDOR KITCHEN — featuring two straight walls, with kitchen essentials equally divided as to working area and storage space. Provides maximum cabinet and work area in a minimum of space.

U SHAPED KITCHEN—actually a combination of straight wall, corridor, and L shaped kitchens. A kitchen that efficiently takes advantage of space; distributes working area and storage space evenly . . . minimizes walking.

Here are a few of the types of "packaged" all-gas kitchens that can be developed from the customized modular cabinet units.

Appliances Complete Package

Appliances sold for use with these all-gas kitchens were chosen from among manufacturers who make gas equipment and who agreed to aggressively advertise and promote both nationally and locally these "All-Gas Kitchens." Electric appliances required for complete package kitchens have been chosen from manufacturers with national reputations who are not considered competitive to the gas industry. Here's the line-up.

Gas Ranges and Ovens
Caloric
Roper
Universal
Western Holly

Gas Refrigerators
Servel

Dishwashers
In-Sink-Erator
James-Universal

Disposals
In-Sink-Erator
National

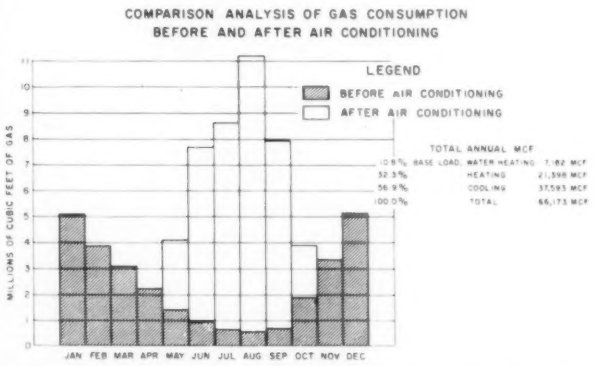
Gas Incinerators
Caloric
James-Universal

Automatic Washers and Gas Dryers
ABC
Hamilton

Countertops
Nevamar

Intercoms, Range Hoods, Sinks and Fittings, Auxiliary Cabinets
Mayfair

The gas industry now has a tool with which to build year-'round loads for gas utilities. ★ ★ ★


COMPARISON ANALYSIS OF GAS CONSUMPTION
BEFORE AND AFTER AIR CONDITIONING
LEGEND
BEFORE AIR CONDITIONING
AFTER AIR CONDITIONING
MILLIONS OF CUBIC FEET OF GAS
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

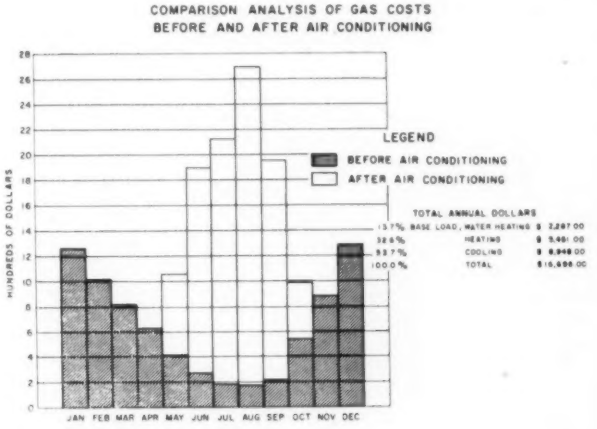

COMPARISON ANALYSIS OF GAS COSTS
BEFORE AND AFTER AIR CONDITIONING
LEGEND
BEFORE AIR CONDITIONING
AFTER AIR CONDITIONING
HUNDREDS OF DOLLARS
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

FIG. 1. Improved annual load factor resulting from installation of gas air conditioning equipment in major bank building in Oklahoma City is shown in these diagrams from Oklahoma Natural Gas Company.

Improve summer load with wider use of gas-fired equipment to provide

Big Building Air Conditioning

Victor Cole, *Product Specialist*
Carrier Corporation

DESPITE the tremendous inroads made by air conditioning in many diverse markets, installations for both new and existing commercial office buildings still form the backbone of the air conditioning business. A continued high level of activity in this market is expected for some years to come, with air conditioning of the smaller office building — averaging 150,000 sq ft — becoming more common.

These developments in air conditioning closely parallel growth of the natural gas industry itself, and come at a time when ways of improving annual, and particularly summer, load factors are a matter of very real importance to sales-conscious gas companies. Sometimes overlooked is the fact that gas can and, wherever practical, should be used to produce air conditioning.

Today, the new office building planned without air conditioning is a rarity. At the same time, the owner of the existing building who is unable or unwilling to provide some sort of cooling, at least through the summer's hottest months, is hard put to maintain a competitive position with newer structures. Much the same is true of hotels, hospitals, and department stores.

Big Equipment Needed

Presently available to produce the chilled water needed in big-building air conditioning systems are large absorption-type refrigerating machines that can utilize gas in substantial quantity, enabling the gas company to even out demand for its product over the summer months. Gas companies that actively promote year-'round use of gas for cooling as well as heating find that, on a given building, winter is no longer the period of greatest consumption. The experience of Oklahoma Natural Gas Company, diagramatically shown in Fig. 1, effectively illustrates how the utility company can improve its summer-load characteristics when gas is used for air conditioning.

As an energizing source, absorption refrigerating machines use low-pressure steam or high-pressure hot water that may be economically generated from gas-fired boilers. Developed by Carrier Corporation, these machines are available in a full range of sizes, from 60 to 700-ton inclusive, and may be connected in parallel for installations of more than 700 tons. Largest installation to date is 6300 tons.

Absorption machines are economical to operate, and have been widely accepted by architects, engineers, builders, and owners, for existing as well as new buildings. Containing no major moving parts, absorption machines are suitable for quiet and vibrationless rooftop operation, with a consequent saving of machineroom space on lower floors.

While these features of absorption-type equipment prove attractive to prospective customers, there is much in favor of electric-drive refrigerating equipment.

Based on comparative costs of electric power and gas in certain areas, the electrically-driven refrigeration plant may be less expensive to operate. Under such circumstances, the salesman selling gas-using equipment has an extremely difficult task of justifying the use of his equipment.

Many gas companies have faced this problem realistically and have built favorable summer loads by adding customers through attractive summer gas rates. They reason that their distribution system and manpower are available for even the light loads usual in summer, and the air conditioning load merely increases the use of facilities and personnel already available, with few, if any, additions.

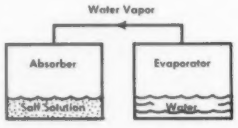
Of the three types of refrigerating equipment most commonly used to chill water, the absorption machine provides the most suitable application of gas to air conditioning when more than 60 ton is required.

In order for the gas utility salesmen to present effectively the application of gas-fired boilers in producing steam for air conditioning, he should be familiar with the operating cycle, applications, and sales features of absorption-type refrigerating equipment. (Fig. 2.)

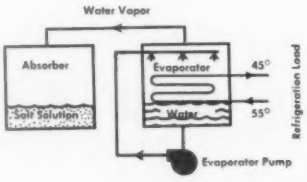
FIG. 2.

Cycle of Operation for Absorption-Type Equipment

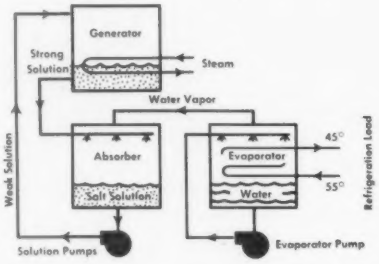
1. Evaporator and absorber. Consider two closed vessels, with salt (lithium bromide) solution in one and plain water in the other. Just as common table salt absorbs water vapor from the air on a damp day, the salt solution in the absorber has affinity for water vapor and evaporates some of the water. Water remaining in the evaporator tank is thus chilled by evaporation and thereby produces a refrigeration effect.



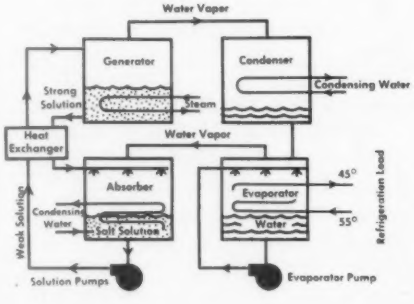
2. Evaporator coil and pump added. Since the absorber and evaporator operate under very high vacuum, low chilled water temperatures may be obtained. To make use of this refrigeration effect, a coil is placed inside the evaporator. A pump circulates water from the evaporator tank to a spray header in order to wet the surface of the coil. The evaporation and cooling effect of this spray on the surface of the coil chills water inside the coil from, for example, 55 F to 45 F as it is circulated in a closed cycle to a refrigeration load.



3. Solution pumps and generator added. Since water vapor is absorbed continuously by the salt solution in an actual operating cycle, its concentration eventually would be weakened or diluted, and its ability to absorb additional water vapor greatly reduced. Therefore, to keep the salt concentration in the absorber at proper strength, it is pumped to a generator where heat is used to raise its temperature and boil off the excess water vapor. Reconcentrated salt solution is then returned to the absorber to continue the cycle.



4. Condenser and heat exchanger added. Water vapor that is boiled off from the weak salt solution in the generator is condensed and returned to the evaporator. A heat exchanger is added to the circuit to conserve heat in the cycle, by using the hot concentrated salt solution from the generator to preheat the cooler weak solution from the absorber. Condensing water from a cooling tower or other available source is circulated through coils in the absorber and the condenser to remove waste heat from the refrigeration cycle.



How It Is Used

Practical application of this cycle to the modern, large absorption refrigerating machine requires the use not of four chambers, but merely of two shells, necessary supports and auxiliary equipment. Fig. 3 illustrates the relationship of absorption cycle shown in Fig. 2 as it actually is applied in the commercial absorption refrigerating unit.

Since the cycle must operate on high vacuum, a separate purge arrangement is provided.

Pushbutton control system in the commercial unit is simple and provides positive control from full load down to zero load, smoothly and automatically. It consists essentially of a chilled-water thermostat in the chilled water line leaving the machine. This actuates the condensing-water throttling valve controlling the flow of water through the condenser. Thus, by controlling condensing temperature, the solution concentration may be controlled and capacity varied.

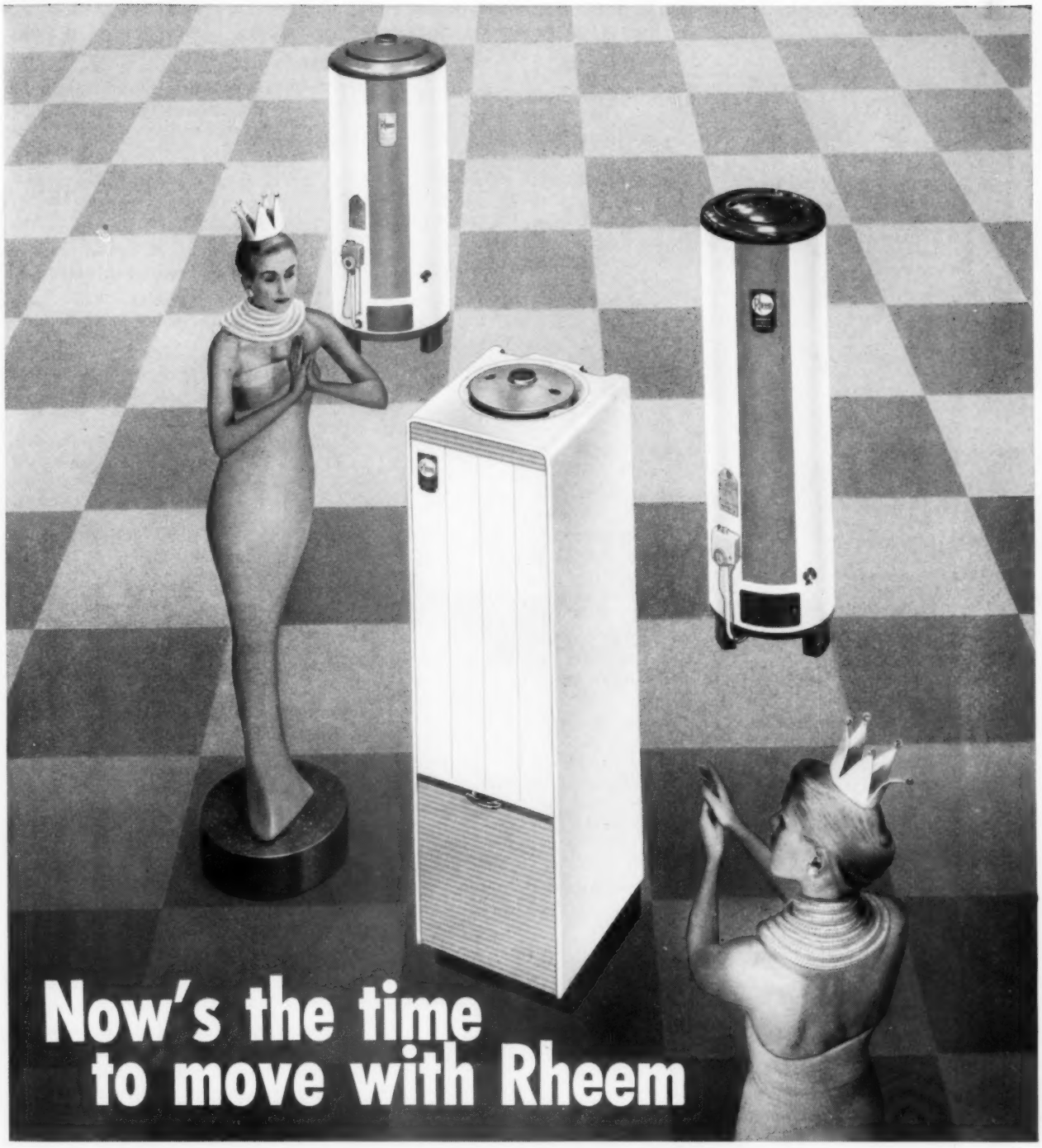
Large absorption machines are available in a full capacity range of 13 sizes, from 60 to 700-ton inclusive, and units may be connected in parallel where refrigeration of more than 700 tons is required.

Roof-Top Installation

Because of its vibrationless operation and small space requirements, the absorption machine is well adapted to current trends in building design and equipment location. These trends can be summarized simply as an attempt on the part of architects, engineers and builders to secure the best possible use of all available space by minimizing machinery and service areas, centralizing equipment and machinery rooms, and reducing necessary service piping and power lines as much as possible.

A few years ago it was a rarity to find a refrigeration machine anywhere but in the basement of a building. Now, more and more refrigeration plants are being located, for space-saving purposes, in rooftop penthouses. Hundreds of thousands of square feet of rentable floor space are ultimately saved. Absorption machines are doubly well suited to rooftop location, since they are automatically controlled, and require minimum attention and maintenance.

With a rooftop location for refrigerating machines, reduction in piping and pumping alone accounts for considerable savings both in installation costs and in space consumed. For example, since refrigerating plants nearly always require a cooling tower — located, as a rule, on the roof — condensing water supply and return lines must be run the entire height of the building



It's the fastest selling line of all!

The water heaters themselves are the big reason. Take the complete Rheemglas series. Inside each there's a glass lining that stands up better and resists the chemical action of hot water. It's made from famous Rheem *Frit!*

And just look at that bright new Rheemglas Holiday with its changeable color panels. Rheemglas-lined inside. Beautifully designed outside to fit in anywhere—kitchen, utility or recreation room. It's square on all four sides—made to be seen!

Then there's the cream of the Rheem line—Coppermatics with pure copper inner tanks. And, too, Rheem offers a special series of galvanized models.

They're all built to last longer. Color-styled to look good anywhere. Priced right. Advertised nationally and locally. Any wonder Rheem water heaters move faster?

Why not call your Rheem distributor for all the details? He'll give you complete product facts and figures, news about the big 1957 promotion program, the profit picture (it's big, too!), and how you can become a Rheem dealer.

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central air-conditioning systems, warm-air furnaces,
wet-heat boilers, plumbing fixtures, water softeners

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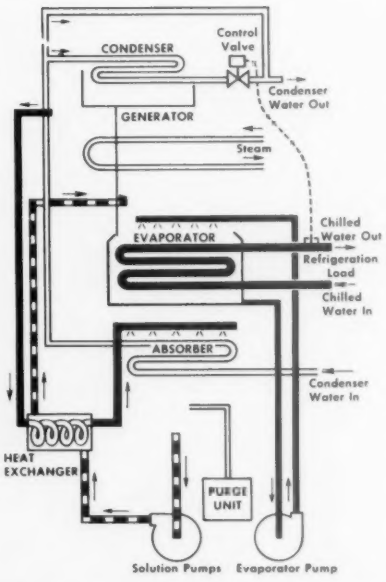

FIG. 3. Cycle of operation as applied to commercial machine.

if refrigerating machines are located in the basement.

If, on the other hand, absorption machines can be located on the roof directly alongside cooling towers, condenser water piping and pumping is vastly simplified, with building-high supply and return lines completely eliminated. Savings of space can be visualized more readily by comparing basement and rooftop locations for refrigerating machines as depicted in Fig. 4.

Loadings on the structural roof members will be somewhat increased. But the additional costs incurred are usually very minor when compared with the obvious first cost savings of a rooftop or penthouse location of equipment.

Space Saver

While rooftop location of equipment is desirable for new buildings, it may, if anything, be even more desirable in an existing building where machinery spaces are already bulging, or where available basement spaces produce revenue. Often, the only convenient space to be found for equipment is on the roof. Here, the light weight and vibrationless operation of absorption machines may be extremely important, for at the time many existing buildings were constructed, little provision was made in the structural supports for large additional rooftop loads. Moreover, most existing buildings have downfeed heating systems, and steam lines of sufficient size for operation of absorption machines are therefore already available at the roof.

The savings to be enjoyed through rooftop location of refrigerating plants as described above are not theoretical. More than 50 percent of the large absorption machines sold in recent years have been installed on the top floors of new and existing buildings. Prominent examples are New York's Hotel Statler (20-story existing building) and Socony Mobil Building (new 45-story skyscraper); Cincinnati's Union Central Annex Building (existing building), and Dallas' Employers Insurance Building (important example of a new building in which gas-fired boilers have been used to produce steam for refrigeration).

Rooftop location of absorption machines has been discussed at length since this equipment is so well adapted

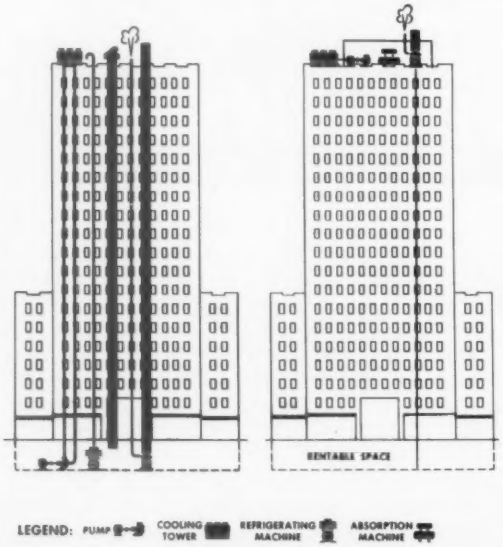

FIG. 4. How rooftop installation saves space, money. At left is basement installation; note amount of space required for air and piping shafts. At right, rooftop installation needs only small, simple piping shaft.

TABLE 1. Sales Features of Large Absorption Machines.

1) Uses low pressure steam economically to produce refrigeration — less than 20 lb per ton per hr of 12 psig steam required.
2) Small space requirements, fitting it readily to current architectural trends.
3) Minimum of vibration — only moving parts are small pumps.
4) Quiet operation — latest design permits extremely low sound level.
5) Widest range of capacity vibration — from 100 percent load down to zero load.
6) Completely safe machine — operates under high vacuum, not a pressure vessel.
7) Plain tap water is the refrigerant — safest and least expensive refrigerant available.
8) Simple salt solution is the absorbent—does not need replacement.
9) Completely automatic operation — machine started and stopped by pressing a button or operation from a timeclock or thermostat.
10) Automatic controls — smooth throttling characteristics throughout entire capacity range.
11) Easy to operate and maintain — requires no skilled mechanic — few parts to wear out.
12) Rapid pull down characteristics — almost immediate response to load changes.
13) Economical use of condensing water—from cooling tower, well, river, etc.
14) Available in full range of sizes— 60 to 700-ton and may be arranged in multiple.
15) Installed in any location — located in any portion of new or existing buildings or industrial plants.
16) Cost can be equivalent to or less than compression systems when all factors are considered—each prospect must be individually analyzed.
17) No special foundation required — machine mounted directly on equipment room floor.
18) Machines require little insulation — high vacuum in evaporator eliminates need for insulating shell.

to the building trend of locating machinery spaces elsewhere than in the basement. But the equipment is equally well adapted to applications where space is not the major air conditioning problem. In hospitals and hotels, where air conditioning is required 24 hours a day, the machine's smooth throttling characteristics, permitting economical operation even at extremely light loads, is highly desirable. In department stores and theaters, where air conditioning needs are likely to be erratic, coming at varying times throughout the year as well as in summer, refrigeration can be provided economically merely by turning on the gas-fired boiler providing steam to the machine; the heavy demand charges which ordinarily would be incurred with electric-drive equipment thus are avoided. In crowded downtown areas where transformers are already heavily loaded and additional transformer space is at a premium, the steam-using absorption refrigerating machine eliminates a costly expenditure, in the form of additional transformer capacity.

These machines have been successfully applied in new and existing apartment houses, churches and schools. In industry, they have been used in textile research laboratories, metal-working plants, food-processing plants, ordnance works, newspaper plants, aircraft factories, breweries, and oil refineries. In fact, they can be applied anywhere chilled water is needed for any purpose and where low-pressure steam is available at economical cost.

Sales Features

Since these machines are sold by a manufacturer's salesman, and generally through contractors, it is unnecessary for the gas company salesman to be thoroughly familiar with all of the operating details. General features of the equipment are outlined in Table 1 to assist him in doing an effective preliminary selling job.

For gas utility companies, the benefits to be derived through the increasing use of absorption-type refrigerating equipment are clear — vastly improved gas load factors with the profitable sale of millions of additional cubic feet of gas. The key to this imposing market rests, in large measure, with the gas companies themselves. Their investigation and considered action on the selling prices of summer gas could do a great deal toward winning new customers.

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2. "Absorption Refrigeration — A Modern Development Using Water Vapor" — A. A. Berestneff, Carrier Corporation. Presented before ASME, 1949.

★ ★ ★

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Assure Complete Protection Against Corrosion with . . . Protecto Wrap COLD APPLIED TAPE . . .
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Protecto Wrap FLOOD COATERS*

1 PROTECTO WRAP COLD COATING

The "cigarette wrap" method of coating underground lines has found wide acceptance because of its economy, ease of use and permanence of protection.

2 PROTECTO WRAP TORCH APPLIED TAPE

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NINETY-EIGHTH YEAR

News and Features Designed to Further Cooperation Among Utilities, Dealers, and Manufacturers

NUMBER 8 • MAY, 1957

Gas Industry's Leading Lady

Brains, Beauty and Baking Skill

Pat Loar, *Assistant Editor*

ONCE again it's May and the eyes of the gas industry turn toward the East —that Mecca of the sun-bathers—Fort Lauderdale, Florida, where the 19th annual Mrs. America contest will be held to select the nation's outstanding homemaker. "Outstanding" in former years meant the girl with the most curvacious measurements, but now it means the girl that can measure, mix, bake, sew, iron, and set the best table.

In contrast to the contest's sunny, sand-strewn setting, you won't find many Mrs. America contestants on the beach. They'll be too busy baking a better batter.

This curious change in Mrs. America contest — from an emphasis on beauty to brainy beauty is a wholesome phenomena of our times. Mrs. America has turned in her bikini for a baker's apron . . . and gladly. This is indicative of a change in American taste. The ideal "Mrs." must have something more than beauty — she must have the combined qualities of wife, mother, and attractive homemaker.

Since the first contest held in 1938, Mrs. America has changed considerably. She is older, has children, and many skills as a homemaker. Several years ago, the average Mrs. America was 19 and childless. Today, she's 34 and averages three children. Mrs. Cleo Maletis (1957 winner) of Oregon, has three sons. Mrs. Ramona Deitemeyer (1956 winner) of Nebraska, has five children. Mrs. Wanda Jennings (1955 winner) of Missouri, has one son.

The first Mrs. America contest held in 1938 at the Palisades Amusement Park in New Jersey was based solely on the premise advanced by Bert Nevins (now president of Mrs. America Inc.) that married women are just as beautiful and attractive as single ones. Since that time, almost everything else has changed: The contest site has moved south to Fort Lauderdale; judges no longer are movie celebrities or entertainment personalities — but home economists and personality experts. Today, judges look for cooks with charm. The list of sponsors has grown to include many giants of American industry. Mrs. America herself has become a woman who must know her "p's" for a "q"—poise and personality for a queen. Despite the many changes in the contest, the original premise still remains—married women are just as attractive as single ones.

During the early years, contestants were mostly professional models selected by a handful of judges. Today, Mrs. America is chosen through a series of contests originating with local gas companies, through state meets, and finally a week-long national level contest judged by seven experts. Homemaking competitions are held for three days, and during this time contestants are evaluated on their cooking, baking, sewing, ironing, and table setting. These judges select the six best all-around homemakers. Three other judges, experts on personality, charm, and stage presence, then name a winner from these six.

During the contest's infancy, prizes for Mrs. America consisted of a $25 trophy and an occasional chance to make a brief appearance at some county fair. Today, she wins $15,000 in prizes.

Being Mrs. America is no longer a

New city-owned Memorial Auditorium in Fort Lauderdale, Florida, will be the scene of the staged homemaking competitions in which the 49 finalists will vie for the title of "Mrs. America" in May.

"queen for a day" job—she is constantly in demand for public appearances, publicity poses, and endorsement of gas equipment. As an example of some of the unusual and exciting things Mrs. America does, Mrs. Cleo Maletis (1957 winner) and her husband were sent on a six-week goodwill tour of seven European countries last year.

And the publicity pays off for Mrs. America's sponsors. Publicity value of the national top homemaker has grown tremendously in the past few years—particularly since AGA (in 1954) assumed the sponsorship of the contest.

In these days of intense competition with Reddy Kilowatt in the kitchen, the value of Mrs. America as a symbol cannot be over-emphasized. The major gas load for utilities is still in the kitchen, and appliances are for the most part still selected by American women in all 48 states. Through the continued use of Mrs. America in promotions, publicity, and personal appearances, she is helping convince her contemporaries that they are missing plenty if they don't go gas.

Specific value of Mrs. America to the gas utilities has been voiced by many individual companies over the nation.

Jerry Happ, North Shore Gas Company official and chairman of the Illinois State contest, said in a recent AGA survey: "We received high praise and many compliments on handling of the contest from all companies and persons who assisted us. It was an invaluable public relations success and we felt the resulting publicity and good will attained made it a very worthwhile investment of our time and money. The contest also created a large amount of increased floor traffic in our stores with a resultant increase of interest in gas appliances and North Shore Gas Company.

In Dallas, through the publicity value of the personal appearance of Mrs. America at the 1956 Dallas Parade of Homes, Lone Star Gas Company estimates that a record crowd of 209,884 visitors saw 300 modern gas appliances on display at a cost to Lone Star of approximately .000009c per exposure.

Newell Robb, domestic sales supervisor, Portland Gas Light Company of Portland, Maine, said, "In regard to local results obtained from such a promotion, it is of course very hard to measure. **Undoubtedly, it did us a great deal of good by bringing the word "gas" to the public attention in a different manner than the periodic use of appliance ads. We feel that the contest is good for the company and good for the industry in general."** ★ ★ ★

NEW SAFETY SYSTEM SEAL MEANS "FEWER SERVICE CALLS"

It indicates that the gas vent was completely designed and installed in accordance with the Metalbestos "Safety System." This new System is based on an established scientific principle governing vent design and installation procedure.

When this Metalbestos seal appears on vented gas appliance installations, utility representatives can be sure the gas vent will work.

- **it means** no spillage that could result in serious damage to the home and its occupants.
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- **it means** fewer complaints and service calls . . . less operating overhead for the gas service department . . . more satisfied gas customers.

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Natural Gas Service for Florida Approaches Full-Scale Operation

Establishment of full-scale operations in bringing the natural gas industry to Florida, involving investments of more than $130,000,000 in the state, has been announced by the newly-formed Houston Corporation, which will take over numerous gas distribution systems in Florida.

B. R. Fuller, executive director of Florida's state development commission, hailed the development as opening "a new era" in the state's economic development.

Total investment of the Houston Texas Gas & Oil Corporation pipeline and the Houston Corporation distribution systems in Florida will amount to $132,657,000. The two corporations plan an annual payroll of $3,834,000 and a roster of 797 employees when work is completed.

The new Houston Corporation plans to acquire and operate a major segment of the state's gas distribution systems, previously confined to the use of manufactured gas.

Distribution properties to be acquired are:

Miami (also serving Coral Gables, Miami Springs, South Miami and West Miami) from the Florida Power & Light Co.

Lakeland and Daytona Beach, also from FP&L.

Jacksonville, from present stockholders of the Jacksonville Gas Company.

Orlando and Winter Haven, from the South Atlantic Gas Company.

Eustis, Mt. Dora and Umatilla, from the Triangle Gas Company.

All the distribution systems being acquired by Houston in Florida will be served by natural gas with the exception of Daytona Beach, which initially will continue to use manufactured gas.

Natural gas also will be supplied to 38 other Florida communities to be served either through new facilities or through existing systems. An additional $39,000,000 in new construction and conversion is planned by these communities in providing this new fuel. They are:

Avon Park, Bartow, Blountstown, Bradenton, Chattahoochee, Chipley, Clearwater, Deland, Delray Beach, Fort Lauderdale, Fort Pierce, Gainesville, Graceville, Green Cove Springs, Haines City, Hollywood, Lake Alfred, Lake City, Lake Wales, Lake Worth, Leesburg, Live Oak, Madison, Marianna, Miami Beach, North Miami, Ocala, Palatka, Palm Beach, Panama City, Perry, Plant City, Pompano Beach, St. Petersburg, Sanford, Sarasota, Starke, Tampa, and West Palm Beach.

Approximately 100,000,000 cu ft a day will be transported for the Florida Power & Light Company and 50,000,000 a day for the Florida Power Corporation, for use in generating electricity. Nine commercial or industrial customers and six municipally-owned plants will be served in addition to the big electric utilities and normal resale outlets. The municipally-owned plants are Orlando, Tallahassee, Gainesville, Lakeland, Starke, and Blountstown.

Houston Texas Gas & Oil Corporation received a certificate from FPC for its pipeline system last December subject to certain conditions, most of which it has since complied with. Its pipeline, beginning at East Baton Rouge, Louisiana, will be supplied by the Coastal Transmission Corporation line, feeding natural gas from numerous fields in the Gulf Coast area of Texas and Louisiana. The two new pipelines represent an original investment of approximately $150,000,000.

Houston's distribution system in Florida will represent an investment of approximately $28,675,000, including presently planned expansion. This includes $12,500,000 in the Miami area, $8,500,000 in Jacksonville, $5,000,000 in Orlando, $1,800,000 in Lakeland and $875,000 in the three cities served by the Triangle Gas Company.

Both corporations will rent temporary headquarters in St. Petersburg until a permanent home office is leased or built.

Construction of the 2600-mile pipeline system and new distribution facilities is scheduled to get under way this year and to be completed in about 12 months.

Admitting that safety is a sound investment, how can Southern Cross Foresters help us?

1. By conducting your gas leakage surveys.

2. By offering a crew to repair the leaks found.
All this at a cost generally less than your own.*

*We could also have emphasized the importance of outside professional assistance as well as the investment return by "unaccounted-for" reduction.

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COMING EVENTS *IN THE GAS UTILITY INDUSTRY*

May

2- 3 PCGA Distribution Conference, El Mirador Hotel, Palm Springs, California.

5- 8 Air Conditioning and Refrigeration Institute, annual meeting, The Homestead, Hot Springs, Virginia.

6- 7 AGA residential gas section, eastern sales conference, Hotel William Penn, Pittsburgh, Pennsylvania.

6-10 National Restaurant Association convention and exposition, Navy Pier, Chicago (AGA will exhibit).

7- 9 AGA research and utilization conference, Cleveland, Ohio.

7-10 Heating, Piping and Air Conditioning Contractors National Association, annual meeting, Hotel Fontainebleau, Miami Beach, Florida.

8-10 Joint AGA-PCGA gas supply, transmission and storage conference, Mark Hopkins Hotel, San Francisco.

10 Southeastern Gas Association, emergency procedure round-table conference, Selwyn Hotel, Charlotte, North Carolina.

12-15 LPGA annual meeting, Conrad Hilton Hotel, Chicago.

16- NEGA operating division, Sheraton-Biltmore, Providence, Rhode Island.

19-22 Industrial Heating Equipment Association, Hot Springs, Virginia.

19-23 ASME oil and gas power conference, Kentucky Hotel, Louisville, Kentucky.

20-22 AGA mid-west regional gas sales conference, Edgewater Beach Hotel, Chicago, Illinois.

20-22 AGA chemical, engineering and manufactured gas production conference, Balmoral Hotel, Bal Harbour, Florida.

20-24 National Fire Protection Association, annual meeting, Hotel Statler, Los Angeles.

21-22 AGA industrial and commercial gas section, managing committee, Sea Island, Georgia.

21-23 Pennsylvania Gas Association, annual meeting, Pocono Manor Inn, Pocono Manor, Pennsylvania.

22- NEGA appliance servicing conference, Hotel Bancroft, Worcester, Massachusetts.

27 AGA Par Committee, Roosevelt Hotel, New York, New York.

June

2- 5 American Gear Manufacturers Association, annual meeting, The Homestead, Hot Springs, Virginia.

2- 5 The American Society of Refrigerating Engineers, Hotel Fontainebleau, Miami Beach, Florida.

3 Gas Technology Short Course, North Carolina State College, Raleigh, North Carolina.

3- 5 American Management Association, general management conference, Statler Hotel, New York.

3- 5 Institute of Appliance Manufacturers, Netherland-Hilton Hotel, Cincinnati, Ohio.

4- 6 Appalachian Underground Short Course, West Virginia University, Morgantown, West Virginia.

5- 7 National Warm Air Heating and Air Conditioning Association, The Warm Air Heating Institute of Northern California, The Institute of Heating and Air Conditioning Industries, and Portland Warm Air Heating and Air Conditioning Association, summer convention, Hotel Fairmont, San Francisco, California.

9-13 ASME, semi-annual meeting, Sheraton-Palace Hotel, San Francisco, California.

12-14 NEGA gas measurement school, Worcester Polytechnic Institute, Worcester, Massachusetts.

14 Public Utilities accident prevention conference, Daniel Boone Hotel, Charleston, West Virginia.

16-21 American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, New Jersey.

19 NEGA street department supervisors group, Hotel Bancroft, Worcester, Massachusetts.

19-21 National Committee for Utilities Radio, annual meeting, Benjamin Franklin Hotel, Seattle, Washington.

23-25 Wisconsin Utilities Association, accounting section convention, King's Gateway Hotel, Land O'Lakes, Wisconsin.

24-25 Michigan Gas Association, Grand Hotel, Mackinac Island, Michigan.

24-27 Canadian Gas Association, Jasper Park Lodge, Jasper, Alberta, Canada.

25-28 American Home Economics Association, St. Louis, Missouri. (AGA will exhibit.)

July

8 Gas Technology Short Course, North Carolina State College, Raleigh, North Carolina.

22-26 Western summer radio-television and appliance market, Western Merchandise Mart, San Francisco, California.

August

26-28 Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, West Virginia.

September

3- 5 Pacific Coast Gas Association Convention, San Francisco, California.

4- 5 AGA operating section organization meeting, Sherman Hotel, Chicago.

6 New Jersey Gas Association, annual meeting, Spring Lake, New Jersey.

9-13 AGA Industrial Gas School, Hotel William Penn, Pittsburgh, Pennsylvania.

10-12 Mid-West Gas Association, gas school and conference, Iowa State College, Ames, Iowa.

11-15 National Hotel Exposition, Coliseum, New York, (AGA will exhibit.)

12 NEGA safety conference, Hotel Statler, Boston, Massachusetts.

13-14 Maryland Utilities Association, 33rd annual fall conference, The Cavalier Hotel, Virginia Beach, Virginia.

16-18 AGA 9th annual accident prevention conference, St. Louis, Missouri.

18-20 Southeastern Gas Association convention, Robert E. Lee Hotel, Winston Salem, North Carolina.

18-20 American Society of Association Executives, annual meeting, Chase-Park Plaza Hotels, St. Louis, Missouri.

20-21 Public Utilities Association of the Virginias, annual meeting, Greenbrier Hotel, White Sulphur Springs, West Virginia.

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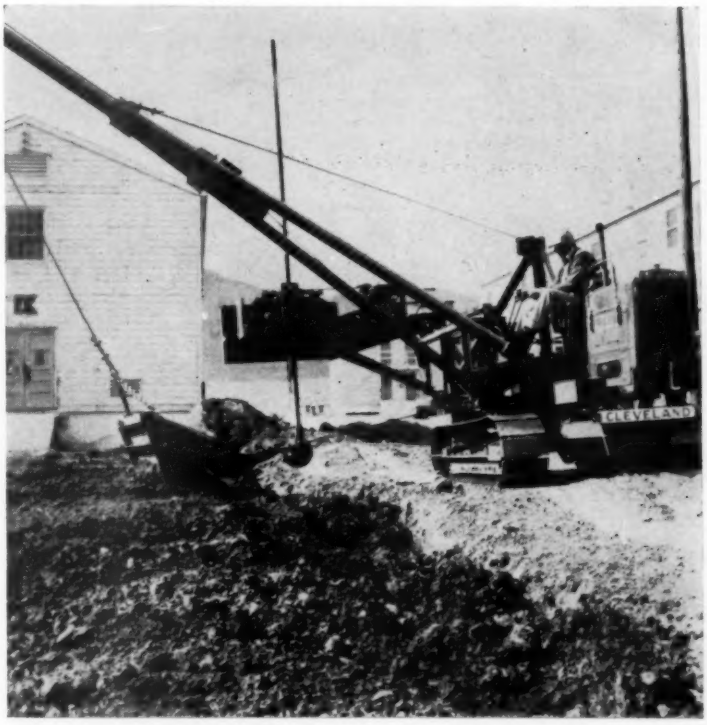
"I'm paying this machine the supreme compliment of saying that it is the only machine I have ever seen that puts the dirt back in the ground as well as a Cleveland 140 trencher takes it out."



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- Tamps From The Bottom Up
- Parallels Work — No Straddling
- Tamps Wider — Tamps Safer

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J. C. Stopford

J. O. Sholar

● **John O. Sholar** has been named president of South Georgia Natural Gas Company of Thomasville, Georgia. He was formerly executive vice president of the company.

● Responsibility for executive direction of the operating departments of Texas Gas Transmission Corporation has been assigned to Vice President **A. L. Roberts.** As vice president in charge of operations, he succeeds the late **L. E. Ingham,** who retired February 1 and who died March 2.

A. L. Roberts

A. R. Blotter

● **Arthur R. Blotter** has been elected treasurer of New York State Natural Gas Corporation.

● **H. A. Eddins,** president of Oklahoma Natural Gas Company, has been accepted for membership in the American Institute of Management.

● **James F. Oates, Jr.,** chairman of the board and chief executive officer of Peoples Gas Light and Coke Company of Chicago, has been elected president and chief executive officer of The Equitable Life Assurance Society of the United States.

J. F. Oates, Jr.

L. P. Jones

● **L. P. Jones,** a sales supervisor in the Texas administrative office of United Gas, has been promoted to sales manager of the Houston division.

● **J. Theodore Wolfe** has been elected president of the Baltimore Gas and Electric Company succeeding **Charles P. Crane** formerly chairman of the board and president, who was re-elected chairman of the board. **Austin E. Penn,** formerly vice president has been advanced to executive vice president, succeeding Wolfe. Other newly elected officers are **Raymond H. Arndt,** vice president, **Alfred P. Ramsey,** vice president and general counsel, and **C. Edwin Bristor,** assistant vice president.

● **Lowell L. Elder** and **Robert S. Ryan** have been promoted from senior engineers to assistant supervisory engineers of the gas engineering department, of The Columbia Gas System, Inc., Columbus, Ohio.

C. T. Dierker

C. R. Rikel

● **C. T. Dierker** has been named general staff supervisor, commercial and industrial sales, for the Southern California Gas Company in a series of sales department management changes. Dierker will direct development of sales activities and policies in the commercial and industrial fields. **C. R. Rikel** will fill Dierker's former post as central division sales manager, and **E. J. Hunter** will take over Rikel's responsibilities as supervisor of building industry sales. Hunter was formerly division sales supervisor of the company's southern operating division.

Vaughan O'Brien

H. S. Walker Jr.

● **Harold S. Walker, Jr.,** has been appointed secretary of the American Gas Association. Succeeding him as secretary of the AGA General Management Section is **Vaughan O'Brien,** formerly editor of the *AGA Monthly.*

● **William S. Beatty** has been elected assistant treasurer of New York State Natural Gas Corporation.

Lucius E. Ingham

Lucius E. Ingham, 65, who until his retirement February 1 was vice president and a member of the board of directors of Texas Gas Transmission Corporation, died of a heart attack in St. Petersburg, Florida, March 2.

G. W. Rice

B. R. Newbery

● **Gerdes W. Rice** has been appointed director of purchases and materials for Lone Star Gas Company and its wholly-owned subsidiary, the Lone Star Producing Company. He succeeds **Ben R. Newbery** who is retiring after 42 years of company service.

● Promotion of four Ohio Fuel Gas Company men to new positions in the Salem district has been announced: **Bruce W. Cox,** Salem division manager, has been promoted to district special representative; **Delmer W. Smith,** local agent at Marysville, succeeds Cox as Salem division manager; **Paul P. Warvel,** Salem district plant engineer, moves up to district plant and service manager; and **Jack D. Wentworth** of Columbus district accounting department, has been named Salem district accounting supervisor.

O. R. Reed

P. E. Brookover

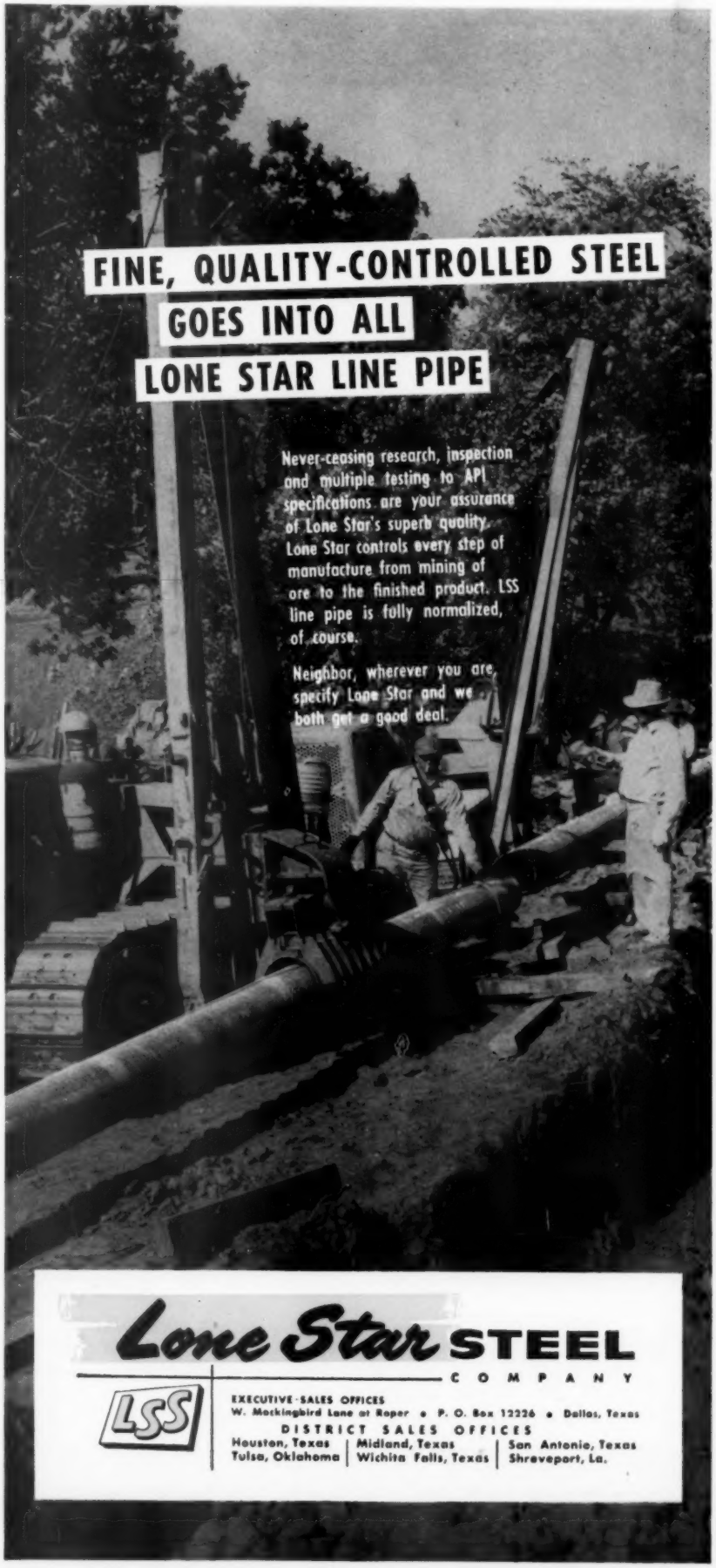
● **O. P. Reed,** vice president and general manager of the Cheyenne Light, Fuel & Power Company has been promoted to manager of employee relations for Public Service Company of Colorado. **Paul E. Brookover,** division commercial superintendent for Public Service, has been appointed to succeed Reed as vice president and general manager of the Cheyenne company.

● **Ralbern H. Murray** has been appointed assistant secretary of the AGA industrial and commercial gas section.

R. H. Murray

J. S. Davis

● **Joe S. Davis** has been appointed general sales manager for Southern Union Gas Company, Dallas, Texas. In this newly created position Davis is responsible for supervising Southern Union's expanding sales program.


FINE, QUALITY-CONTROLLED STEEL
GOES INTO ALL
LONE STAR LINE PIPE
Never-ceasing research, inspection and multiple testing to API specifications are your assurance of Lone Star's superb quality. Lone Star controls every step of manufacture from mining of ore to the finished product. LSS line pipe is fully normalized, of course.
Neighbor, wherever you are, specify Lone Star and we both get a good deal.
Lone Star STEEL
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EXECUTIVE-SALES OFFICES
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Here's a matchless GAS range
you can SELL

the distinctive new

VESTA

It's New!

Equipped with the famous HARPER burners. New THERMAL EYE automatic top burner available on all models.

A GIANT OVEN IN A SPACE-SAVING 30-INCHES!

Center simmer burners . . . Oven Window and Light . . . Built-in Clock . . . Built-in Timer . . . Built-in Lamp . . . Matchless, Automatic Lighting of Oven and Broiler.

MODEL NO. 96-AEF-21

Featuring an Extra-Large Oven!

SPECIFICATIONS

Oven	24" x 19" x 16"
Broiler Drawer	22¼" x 18¼" x 5¾"
Cook Top	30" x 22"
Floor Space	30" x 26½"
Cook Top Height	36"
Overall Height:	
Deluxe Backguard	46⅛"
Approximate Shipping Weight	230 lbs.

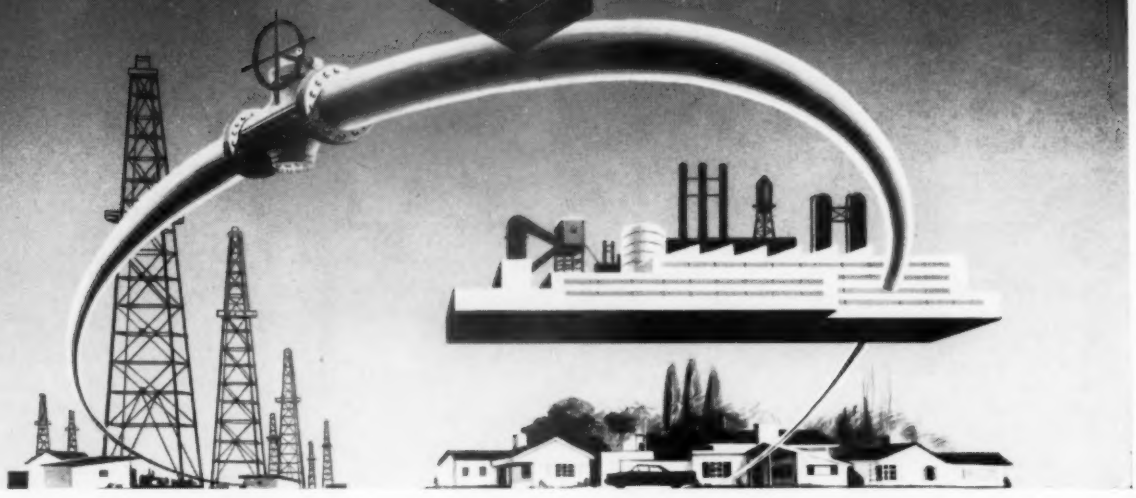
Mr. Gas Utility Sales Manager: Now you can sell matchless gas cooking at its best . . . with a thrifty price tag that will appeal to all your customers . . . helping them enjoy ALL of the cooking magic of today's newest matchless gas range . . . the distinctive VESTA!

ATHENS STOVE WORKS, INC.
ATHENS, TENNESSEE

GAS does more costs less!

30 years of progress with the Natural gas industry

ORONITE®



Since the first commercial gas odorant production, Oronite is proud to have become an integral part of the gas industry. Manufacturing and technical facilities have been continuously expanded through the years to fulfill the ever-growing requirements of this dynamic industry. Today, and in the years ahead, you can look to Oronite for the finest odorant products and most complete service.

Oronite's service to customers is unequalled!

Oronite maintains a technical field service staff of trained odorant specialists who work closely with the utility and transmission companies. These men are backed by extensive laboratory facilities to assist in solving individualized customer problems. As a further service, Oronite's unique odorometer offers the simplest way to test odor intensities and determine adequate odorization.

A phone call or letter to any Oronite office will promptly bring an odorant specialist to consult and assist you on gas odorization.

Oronite's complete and versatile line of gas odorants!

Calodorant® C—completely stable cyclic sulfide-type odorant
Calodorant® C Special—blend of Calodorant C and solvent
Calodorant® B-1—a sulfide odorant at a mercaptan price
Alert® 80—best economy-priced, quality mercaptan odorant
Ethyl Mercaptan—a high quality pure mercaptan for LP gas
LPG Odorant—tailor-made from a selected mercaptan cut

ORONITE CHEMICAL COMPANY

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SALES OFFICES
New York, Wilmington, Chicago, Cincinnati, Dallas, Los Angeles, San Francisco
EUROPEAN OFFICE
36, Avenue William-Favre, Geneva, Switzerland

4209

TRADE PERSONALS

MEN WORKING WITH THE GAS UTILITY INDUSTRY

D. M. Mayne

● **Donald M. Mayne,** who has been in the gas air conditioning business for more than 20 years, has announced the formation of a new marketing consulting firm specializing in gas air conditioning. Headquarters of the new firm will be at 4321 Shenandoah in Dallas.

● Recent appointments announced by Walworth Company include **Frederick M. Jackson** to vice president in charge of sales, **George E. McDonald** to vice president and treasurer, and **John C. Wallace** to vice president of engineering. Wallace was formerly vice president and general manager of Hunt-Spiller Manufacturing Corporation of Boston.

● **Gerry Powell,** former manager of White-Rodgers Company's Chicago region, has been appointed assistant sales manager.

T. J. Watt

R. G. Burr

● Sprague Meter Company has announced the appointment of **Thomas J. Watt** and **Robert G. Burr** as advertising manager and assistant advertising manager, respectively.

● Bastian - Blessing Company, Chicago, has made two executive promotions: **Hugh A. Barnes** has been promoted from purchasing agent to director of purchases, succeeding **A. L. Augur** who retains the title of executive vice president. **Hugh A. Blaney** has been promoted to controller, a new position with the company.

● All directors of Servel, Inc., were re-elected at the annual stockholders' meeting and **John H. Wall,** executive vice president and general manager, was elected as the tenth member of the board.

● Appointment of **A. W. Roat** as applications engineer, controls sales section of the Fulton Sylphon Division of Robertshaw-Fulton Controls Company, has been announced. Roat formerly served on the sales staff of the company's Fielden Instrument Division.

● **G. L. Stancliff Jr.** has been appointed vice president and general manager of Askania Regulator Company, Chicago, a subsidiary of General Precision Equipment Corporation.

● **John A. Robertshaw, Jr.,** has been elected a vice president of Robertshaw-Fulton Controls Company. A grandson of one of the founders, Robertshaw has been associated with the Robertshaw-Fulton Controls Company since his school days, working in plant and office jobs during off hours and vacations.

J. A. Robertshaw, Jr.

● **Harry Welch** has been appointed to the position of advertising manager of the Controls Company of America of Milwaukee, Wisconsin. Welch, former advertising manager of the A-P Controls Division, will coordinate the advertising for the following products, sales divisions, and subsidiaries: Soreng Products; A-P Controls, and Milwaukee Valve Company. He will also handle general corporate and International Division advertising.

Harry Welch

V.I.P.*

COROMAT

OWENS-CORNING FIBERGLAS

Underground pipe wrap

*very important protection

other pipe line services by MIDWESTERN

KAPCO
. . . Rock Shield—protects pipe and coating against rock, **without** dirt-padding.

GLASFAB
. . . for handwrapping hot lines and holidays—reliable, high tensile strength.

KEYSTONE
. . . Asbestos Felt Continuous membrane with parallel reinforcement . . . gives greater strength, longer life, faster application.

GLASKOTE
. . . Handy Tape for pipeline joint wrapping . . . for above or below ground . . . no hot dope needed.

KERMAC
. . . Pipeline Outerwrap—for fewer breaks and holidays — faster wrapping—maximum strength and resistance.

Stronger, longer reinforcement of pipe line enamel is the important job of Owens-Corning COROMAT — the only true Fiberglas underground pipe wrap . . . Fibers of glass, bonded with a thermo-setting resin, form a flexible mat, with closely spaced longitudinal reinforcing. Fast and easy to apply, Coromat offers the *most* protection during application and throughout its service.

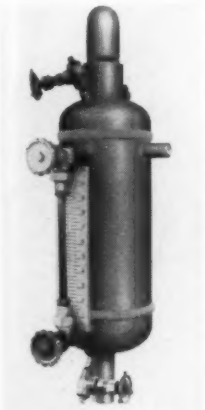
branch offices—
- Houston, Tex.
- Atlanta, Ga.
- Mt. Prospect, Ill.
- Pittsburgh, Pa.
- Oklahoma City, Okla.
- Portland, Ore.
- New York, N.Y. (export)

MIDWESTERN PIPE LINE PRODUCTS CO.

4645 Sapulpa Rd. Tulsa, Okla. Hickory 6-6144
Cable Address: Mid Pipe

NEW EQUIPMENT
FOR THE GAS UTILITY INDUSTRY

For more information on items described here in brief, use the handy reply card and circle the corresponding numbers



Odorizers. New H & H Odorizers, manufactured by Tod Pazdral Pipeline Specialties of Houston, Texas, include the bypass wick type and a larger unit of the combination drip and absorption type. These units are custom-built to provide adequate service for each specific installation. H & H Odorizers have no moving parts and require no maintenance. They function properly even in severely cold weather. Models are available in all sizes for distribution systems. *Tod Pazdral Pipeline Specialties.*

CIRCLE (1) ON THE REPLY CARD

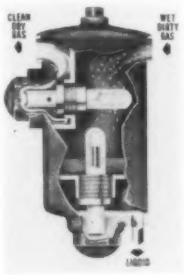
Large Pipe Filters. Gas and air filters for 6 and 8 in. and larger pipe have been announced by Norwalk. Equipped with a patented built-in baffle, filters assure maximum passage of gases and air through filtering material thereby giving complete removal of dust and scale. Filters reverse end-for-end or top-for-bottom to eliminate the possibility of improper installation in the field. *Norwalk Valve Company.*

CIRCLE (2) ON THE REPLY CARD

Utility Ditcher. Production of an improved Gar Wood-Buckeye Model 403 utility ditcher that incorporates foot pedal steering, shiftable spoil conveyor, and new hydraulic controls has been announced. Specially designed for "stop and go" utility ditching, the unit has a new hydraulic pump that provides full-time

hydraulic pressure for instant control of the digging boom. New system eliminates need for hoist-clutch, while at the same time reducing the number of moving parts. Foot-pedal steering arrangement replaces hand levers, giving operator greater control and accuracy. Exclusive slip-clutch automatically protects from overloads. Unit has maximum digging capacity of 5 ft deep and 12 in. wide, or 4 ft deep and 16 in. wide. *Gar Wood Industries, Inc.*

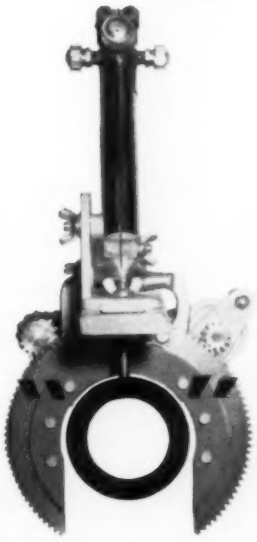
CIRCLE (3) ON THE REPLY CARD



Liquid-Gas Separator. Liqui-Jector, a device for removal of entrained liquids and solids from air, gas, and steam systems that was previously furnished as specially designed units by Selas Corporation of America, is now available in 12 standard sizes. Unit completely removes suspended liquid and solid particles from process and instrument gas supply lines. Liqui-Jector units are now available in three standard models: Series A for volumes up to 100 scfm gas at 150 psig; Series B for volumes up to 7000 scfm gas at 200 psig; and Series C for conditions where unusually large volumes of condensate are encountered. Selas will continue to build specially-engineered units for special operations. *Selas Corporation of America.*

CIRCLE (4) ON THE REPLY CARD

model "O" for small diameter pipe cutting and beveling



Welding of small diameter pipe (1½" to 4") becomes the easiest, quickest, most accurate — **and most economical** — means of joining such pipe when every cut and bevel is square and accurate.

The never-failing precision-action of H & M's exclusive Model "O" has been field-tested and proved on hundreds of welding jobs — **even** when operated **by apprentice welders!** A perfect cut and bevel can be made on 2" pipe, for instance, in less than 30 seconds actual cutting time — **by an inexperienced operator.**

The H & M Model "O" is built on the same split-gear horseshoe principle as the larger H & M Machines (for 4" to 36" pipe). Weighing only 7½ lbs., it may be placed on continuous pieces of pipe — moved from one pipe to another — changed from one size to another — **all in a matter of seconds!**

If you are manually welding your small-diameter pipe — or if you aren't welding at all — an H & M Model "O" Pipe Cutting and Beveling Machine is your primary step towards greater speed, accuracy, precision and profits in joining small diameter piping.

The Model "O"— like all H & M Machines — can easily and quickly be motorized for automatic operation.

Write today for illustrated bulletin.

H&M PIPE BEVELING MACHINE COMPANY

TULSA, OKLAHOMA

Trademark Registered

311 E. Third St. Diamond 3-0241

How to control gas odorization

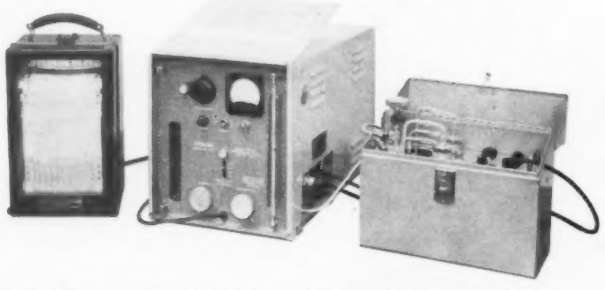
.....and minimize "nuisance" complaints

Before installing CEC's Titrilogs, a large Eastern gas works commonly received several hundred "nuisance" leak reports during short periods—all caused by over-odorization. Since the installation, there has been only one occasion in two years when "nuisance" reports were attributed to the odorant.

This major Eastern company serves 600,000 customers through 150 miles of transmission mains and 2350 miles of distribution mains. Gas odorization is checked by four Consolidated Titrilogs monitoring incoming gas from two transmission companies. Readings from the Titrilog charts are easily converted directly into pounds of odorant per million cubic feet.

When a reading is either above or below prescribed limits, the supplier is notified and immediately corrects his odorization equipment.

CEC's 26-103 PORTABLE TITRILOG



Noted for exceptionally high sensitivity, wide range, and fast response, this stable instrument continuously records sulfur-compounds in concentrations as low as 0.1 ppm or 0.005 grains per 100 cubic feet. *Find out how fast the 26-103 pays for itself. Contact your nearby CEC field office, or write for Bulletin CEC 1810-X15.*

Consolidated Electrodynamics

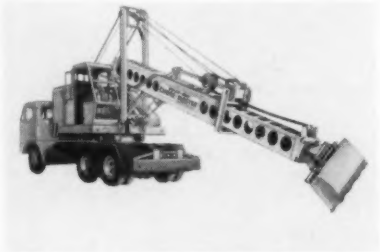
300 North Sierra Madre Villa, Pasadena, California

OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

Flyweight Plastic Curb Boxes. Handley Brown Heater Company has introduced two new flyweight plastic curb boxes with magnetic tops and built-in aluminum plates for easy location with either electronic or magnetic finders. Made of Kralastic, the new boxes are non-corrosive, very tough, and weigh only 1/7 that of cast iron. Since the boxes are non-corrosive, the telescoping sections are always free to collapse and danger of car or truck wheels breaking curb stops or service piping is eliminated. Built-in permanent magnets with aluminum plates make the boxes easy to find. *Handley Brown Heater Company.*

CIRCLE (5) ON THE REPLY CARD

"Quick-Way" "Chore-Master." A new hydraulic reaching, grading, digging attachment for Crane-shovels has been introduced by The "Quick-Way" Truck Shovel Company. The "Chore-Master" is a telescoping boom that mounts on a special gantry and is interchangeable with other standard attachments on "Quick-Way" cranes. Telescoping action is operated by a large hydraulic cylinder. A second hydraulic ram opens and closes the bucket with a wrist action. A hydraulic motor rotates the bucket 50 deg in either direction on the end of the boom. *The "Quick-Way" Truck Shovel Company.*

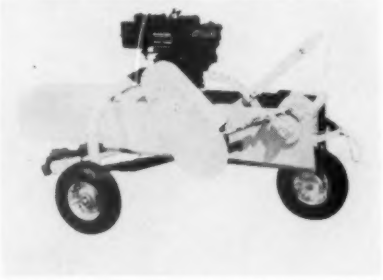


CIRCLE (6) ON THE REPLY CARD

Selective Signaling Package. A single-unit console providing complete selective calling facilities for land-mobile two-way radio base station installations has been announced by Motorola. Recently added to the "Quik-Call" selective signaling line, the new console combines all tone signaling elements, including tone generator, timer, power supply, and code selector—all in a single compact package. Installation, adjustment, and operation have been greatly simplified and the unit can be quickly and easily added to any existing two-way radio system, regardless of make or model. Approximately 13 by 10 by 7 in., unit weighs 24 lb complete. *Motorola.*

CIRCLE (7) ON THE REPLY CARD

Ground Saw Trencher. Self-propelled low cost automatic trencher has been introduced by Cosom Engineering Corporation. Unit automatically propels itself by aircraft cable winch drive and digs trenches 2¼ in. wide at depths of 12, 18 or 24 in. Ground Saw rolls on the lawn and will not damage turf. It automatically stops trenching when it reaches the end of the cable. This automatic feature frees operator for other work. In addition to being self-propelled, the machine is lightweight and portable. Powered by a 2¾-hp gasoline engine, its hardened steel teeth literally "saw" through the toughest soil conditions. Drive and trenching mechanism are completely shielded for accident-free operation. Unit trenches at speeds up to 3 ft per min in average soils. *Cosom Engineering Corporation.*



CIRCLE (8) ON THE REPLY CARD

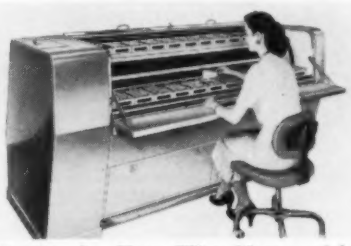
Corrosion-Resistant Valve. An all plastic Y-globe valve with full flow passage has been introduced by Walworth Company. Made of rigid polyvinyl chloride, the new PVC valve provides tight shutoff and flow control. Special bonnet and gland nut design provides an absolute leak-proof unit. Because of its sturdy construction, the valve will operate successfully at pressures up to 150 psi at 70 F. *Walworth Company.*

CIRCLE (9) ON THE REPLY CARD

One lightning bug to another: "Gimme a push; my battery's dead."

Barber-Greene Wheel Ditcher. Barber-Greene Company has announced their entry into the wheel-type ditcher field. Model 774, a crawler mounted unit, this model has a 5 ft, 6 in. digging depth and widths, adjustable in 1 in. increments from 18 to 30 in. Widespread use of hydraulic power transmission, unique, flexible connection between chassis and digging wheel, electric, magnetically actuated overload release clutch, and reversible spoil conveyor are unit innovations. *Barber-Greene Company.*

CIRCLE (10) ON THE REPLY CARD



Housing for Your Files. New model of Super Elevator File has been announced by Diebold, Incorporated, designated the Super "63." Finding the right record is as easy as pushing a button. When depressed, the latch-type button automatically holds contact until the desired record tray reaches the correct working position. No record is more than an average of three seconds away from the operator's finger tips. *Diebold Incorporated, Systems Division.*

CIRCLE (11) ON THE REPLY CARD

To your 49th* . . . From our 61th†

Congratulations From Briggs-Weaver and some of the Fine Products They Carry:

RUSTOLEUM
GOLDAK
PIPE
NORDSTROM VALVES
WOOD SHOVELS

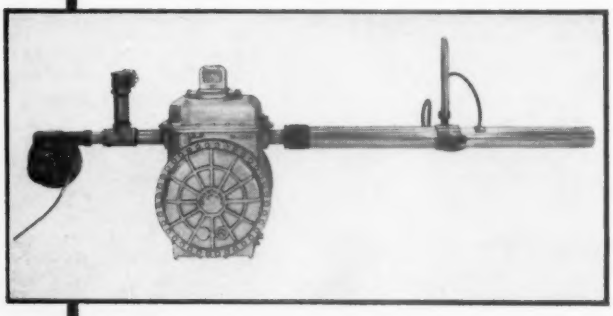
*S.G.A. Annual Convention

†Anniversary

BRIGGS-WEAVER MACHINERY COMPANY
DALLAS
HOUSTON
FT. WORTH

Distributors of Industrial Machinery - Supplies - Tools - Equipment - Since 1896

Prove Displacement Meters In the Field Quickly and Easily with AMERICAN® Flow Provers



Precision-built American Flow Provers provide quick and accurate proof testing of high capacity positive displacement meters in the field. Lightweight and portable, American Flow Provers are provided in 2, 3 and 4-inch models.

American Low Pressure Flow Provers, designed for hardcase displacement meter proof testing with air or gas at pressures below 15 psi, are supplied with calibrated orifice discs with proving rates to 10,000 cfh. Where gas cannot be conveniently discharged into surrounding atmosphere, a portable blower may be used.

American Critical Flow Orifice Provers, designed for 250 psi working pressure, are available with calibrated orifice discs for volumes to 6,000 cfh.

Consult your American representative for full information.

AMERICAN® METER COMPANY

INCORPORATED (ESTABLISHED 1836)

GENERAL SALES OFFICE: Somerton, Philadelphia 16, Penna. • Albany Alhambra • Atlanta • Baltimore • Birmingham • Boston • Chicago Dallas • Denver • Erie • Houston • Kansas City • Los Angeles • Minneapolis • New York • Omaha • Pittsburgh • San Francisco • Seattle Tulsa • Wynnewood. IN CANADA: Canadian Meter Company, Ltd., Milton, Ontario • Calgary • Edmonton • Regina

SUPPLIERS TO THE GAS INDUSTRY for Ironcase, Tinned Steelcase, Aluminumcase and Welded Steelcase Meters • American-Westcott Orifice Meters Instruments • Reliance Regulators • Apparatus • Valves

Peak Shavings

. . . . with laughing gas

Demonstrating once again the importance of the lowly comma, this telegram was sent from a wife to her husband: *"Not getting any, better come home at once."*

◆

The stranger walked up to a Las Vegas dice table and laid down a $1000 bet. He shook the dice, but as he threw them a third cube fell unexpectedly from his sleeve. The house operator was unruffled. He handed back two of the dice and pocketed the third, saying, "Ok, roll again. Your point is 15."

◆

A much-married society darling has gone into deep mourning since the death of her last husband. She even insists on black olives in her martinis.

◆

The kid, aged five, was muttering to himself as he dressed in the morning.

"Hummmm," he said, "button gone off — and right in the busiest place, too."

◆

Notice in doctor's office: "Ladies in waiting room are asked not to exchange symptoms. It gets the doctor hopelessly mixed up."

◆

You can't fool all the people all the time — some of them are fooling you.

◆

Hear about the octopus who fell into the cement mixer? Just a crazy mixed up squid.

◆

Minister presiding at a funeral: "Friends, all that remains here is the shell; the nut is gone."

◆

Let's shed a tear for the unfortunate shoe salesman, with a lisp, who got slapped when he asked an adequately proportioned female to sit down while he "looked up her thize."

◆

"My father always proposed a toast before he disciplined me."

"How odd! What was it?"

"Bottoms up."

◆

Familiarity breeds attempt.

◆

Drunk (lying on sidewalk): "I'll climb this wall if it takes all night!"

◆

A young couple met and married in a Florida resort. They agreed to begin life anew and not discuss their past.

One day they were sitting around the pool — he walked over to the pool and made a series of excellent dives from the high diving board. He returned to his chair and sat down.

"Honey!" his wife exclaimed, "that was wonderful. Where did you learn to dive like that?"

"Mary, we agreed not to discuss our pasts, but I'll tell you about my diving. I was high-diving champion for three years."

Shortly afterward Mary decided to take a dip. She slipped into the pool, and swam the length in record time. When she returned to her chair John exclaimed, "Mary, you, too, must be a swimming champion!"

"Well, honey, since you asked—I was a call girl in Venice."

Things to write for . . .

Transmitter. New four page bulletin describing Barton's Model 214 Indicating Pneumatic Transmitter is now available. Designed to fulfill industry requirements for a compact, stable, accurate, and trouble free differential pressure transmitter, the unit also includes such features as direct indication of differential pressure, unique pilot valve with high air capacity, constant nozzle pressure and a linearity adjustment. Relatively light and compact, the transmitter may be mounted right at point of measurement. *Barton Instrument Company.*

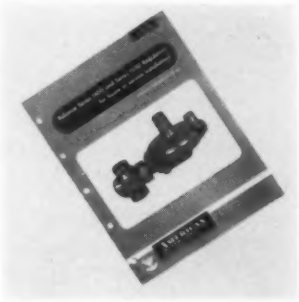
CIRCLE (41) ON THE REPLY CARD

Draft Hood Bulletins. AGA Laboratories Research Bulletin 74, "Principles of Draft Hood Operation and Design," and its companion, Research Report No. 1261, "Draft Hood Design Manual," are now available from the American Gas Association. Bulletin 74 presents an analysis of draft hood operation considering such factors as draft hood size, type, baffles, restrictions, appliance heat input, and flue gas temperature. Design information developed from this information is concentrated in the companion Research Report No. 1261. Both publications resulted from PAR Project DA-1-HA, "Investigation of Draft Control Methods and Equipment," sponsored by the Committee on Domestic Gas Research through its Technical Advisory Group for Heating and Air Conditioning Research. *Bulletin 74, $5.00; Report No. 1261, $1.00, American Gas Association.*

CIRCLE (42) ON THE REPLY CARD

Top burner control for gas ranges, named "Topstat," has been introduced by Penn Controls, Inc. The control automatically regulates burner flame to prevent foods from scorching and burning in pots or pans. Further information available. *Penn Controls, Inc.*

CIRCLE (43) ON THE REPLY CARD



House Gas Regulators. A comprehensive brochure just published by American Meter Company describes Reliance Series 1400 and 1500 regulators. Bulletin 100 gives complete details on 36 different regulator models including construction, capacities, dimensions, standard modifications and replacement parts. Series 1400 refers to the 36 regulator models without meter bars. Same models with meter bars are classified as Series 1500. *American Meter Company.*

CIRCLE (44) ON THE REPLY CARD

Gage Accessories. New Bulletin No. 600, just published by U. S. Gauge describes accessories for various types of gages, dial thermometers, and recorders. These accessories include attachments for protection of instrument internals against corrosive media and pulsations in pressures; panel-mounting for turret-case instruments and other tools and fittings used in instrument operation. *U. S. Gauge Division, American Machine and Metals, Inc.*

CIRCLE (45) ON THE REPLY CARD

Plastic Pipe. New four page two color bulletin on "Kraloy Plastic Pipe for the Gas Industry" is now available from the manufacturer. Photos and diagrams show procedures for quick installation of new Kraloy gas service, for pipe replacement, and economy and simplicity of other Kraloy services. Advantages cited for plastic pipe are smooth interior walls, 20 percent more efficient initially, that makes it possible to use smaller pipe sizes; non-corrosive material (efficiency curve improves with age because Kraloy is not subject to rust, rot or electrolytic action). *Kraloy Plastic Pipe Company, Inc.*

CIRCLE (46) ON THE REPLY CARD

Meters, Regulators, and Valves. A completely revised condensed catalog of Rockwell meters, regulators, and valves is now available from the Rockwell Manufacturing Company. Outstanding new features of the catalog include: Photo-illustrated descriptions of the recently introduced Rockwell telapilot with power pilot loading by remote control and the Hypregun, a light compact, efficient air-operating valve lubricant gun. The 28-page catalog also includes revised Nordstrom valve specifications. *Meter and Valve Division, Rockwell Manufacturing Company.*

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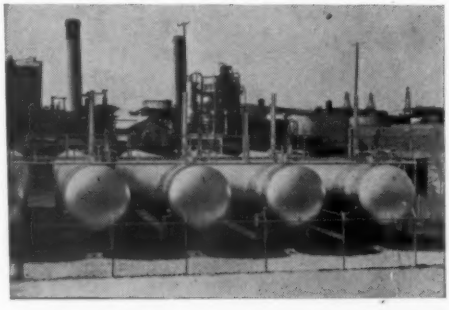

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New Literature

Gas Service Products Catalog. New 128-page catalog for gas utilities describes over a thousand different styles and sizes of gas service products manufactured by Kitson Valve Division of The Welsbach

Corporation. Products included are brass gas stops, iron body gas stops, high-pressure gas valves, gas meter connections, emergency gas shut-off valves and temperature and pressure relief valves. *The Welsbach Corporation.*

CIRCLE (48) ON THE REPLY CARD

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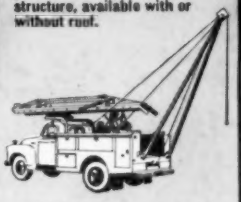

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